Exploring e-learning implementation models and the changing conceptions of technology

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Abstract

An emergence of technology to enhance teaching and learning in higher education has increasingly called for an interest from academic institutions, and subsequently brings the potential of change in education. A new style of teaching and learning has been introduced with a still evolving nomenclature for terms such as *tele-learning, online learning, web-based learning, and e-learning*. Along with the wave of technology, its importance has influenced the national policy of many countries, and then become an international issue. It appears that the national education plans of many countries have included this in and highlighted it as a major focus by allocating budgets to the development of technical infrastructure to facilitate this new form of learning.

The beginning of the concept of open and distance learning, followed by tele-learning, and lastly e-learning is the stream of this study. Bringing innovation to organisations, however, is not an easy process. The study here highlights this point. Results from many studies indicated that a lack of good preparation could result in less success, or at worst failure, for the organisation. To minimise this risk in educational reform and to increase the potential for success, the process of change and planning for change must be prepared. An implementation process, as an important stage of change, becomes a focus of the study. However, since managing change in an organisation requires multi-disciplinary concepts and multi-skills, the study here has introduced theories of innovation and change from management, technological, and educational disciplines to form a conceptual framework, and links empirical evidence with the related theories to inform a new picture, or perhaps, reshape a landscape of e-learning when implementing it in practice.

Two case studies from educational technology and nursing disciplines in western countries were chosen to explore. Sharing experiences from implementers' perspectives helps reveal how innovation had been introduced to the organisation, and how they managed to overcome problems and barriers that had been happening along the change process. Analysis from the two cases should help develop a conceptual model. The Faculty of Nursing at Mahidol University in Thailand would be visited to explore the possibility of implementing the model. The analysis with related documents would inform modification of the conceptual model. Findings from the study and in particular the articulation of a model grounded in the local context for innovation, will assist the administration of the institutions, as well as policy-makers, in developing appropriate strategic plans and bridging the gaps between policies and practice.

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Chapter 1: Introduction

1. Background of the Study

Telecommunication technology plays an increasingly important role in our world. Many observers suggest that Information and Communication Technologies (ICTs) are transforming the way information is created, processed, stored, transmitted, and used by public and private institutions and by individuals in everyday lives (Mansell 1998). To date, the communication on networks, particularly via the World Wide Web (WWW), not only enables people to communicate with each other faster and more easily than before, but also brings the potential for a change in education. Emerging Information and Communication Technologies have created new styles of teaching and learning, and a number of projects have been developed to exploit this benefit. Many terms have been created to describe these innovative methods, for example *tele-education, tele-learning, tele-teaching, telematics, web-based learning, online learning, e-learning*, and the like. These terms have proliferated and are still not firmly identified. Different authors use different terms and define their own meaning although the main concept is similar. It is believed and often stated that technologies will increase flexibility and equity in learning, and promote the concept of Open and Distance Learning. In this regard, people can learn from anywhere and at anytime. The technologies appear to influence policy and planning at national and international levels. The concept of Open and Distance Learning has been considered an aspect to exploit ICT in education. Governments, and not only those in leading world countries, are unable to ignore its importance. Hence, more national funding and budgeting have been allocated in this area to shake this stage, and a number of related projects in this context have obviously been increasing.

In this study, tele-learning, an innovative method, will be explored. It is a concept of teaching and learning that uses ICT for educational purposes, similar to the concept of distance learning but differing in some aspects. Despite its flexibility to learn on-campus and off-campus, tele-learning has increasingly created an opportunity for educators and learners to interact to each other more than before. However, bringing change and the innovation into organisations is not an easy process. In education, in

particular, "T*eachers are problematic to change*", and has higher resistance to the innovation than other systems (Morrish 1978, p.55).

Issues regarding innovation and change have been happening in educational arena for years. Many scholars share experiences and reflect something about it. For instance, Havelock (1970) indicates that, "*Educational planners and policy-makers are continually bedevilled by the fact that few innovation efforts ever achieve their promised impacts.*" *(p.81).* Interestingly, in Adams and Chen's report (1981: p.274) from case studies of educational innovations in seven countries has mentioned that, "*the road to educational development is strewn with the debris of shattered innovations.*" The report also highlighted success and failure of any educational reform and reflected by giving us a descriptive picture:

> ...When innovations begin, hopes are raised, enthusiasms engendered and actions motivated. But then if failure follows, the major products become disappointment, disillusionment, suspicion and despondency. The original problem still remains unsolved but additional new ones have been created as well. Under such circumstances, there is a margin of inefficiency that cannot be tolerated even in education. At a time when economic conditions are becoming more and more difficult, that margin is ever shrinking. Increasing investment in education is thus unlikely and extravagant expenditure in its name will become a thing of the past. It follows, then that education has to find ways of doing its job better and more economically. One of these ways clearly involves being able to increase the likelihood of success of any educational reform. (Adams and Chen 1981)

Hence, the low rate of success in implementing change has made this phenomenon an important focus for research. To minimise risk of failure in educational change, and increase potential to success; process of change, planning for change, and managing change should be considered and prepared in an early stage. This is based on an assumption that innovation and change, as well as implementation process, can be planned in advance. The implementation process, as a stage of the innovation and

change process, has been recognised as a vital stage to transform theory into practice (Fullan 1991).

Thailand is in a transition stage of transforming the National Education Development Plan from No. 8 (1997-2001) to No. 9 (2002-2005), and currently approaching No. 10 (2006-2009). Technology was regard as important and must be embedded in many aspects of education, for example change in teaching and learning, educational management, and increasing quality in education. Open and Distance learning were considered to support this plan.

The Faculty of Nursing (FoN) at Mahidol University in Thailand has been recognised as a leading academic institution in nursing education, research, and academic services in Thailand for years. Founded in 1896, the Faculty is the oldest and largest nursing school in the country. At the end of 1999, the Faculty had approximately 2,063 students in all programmes, and approximately 200 full-time academic staff (Mahidol University 2000). The University's strategic plan and direction, announcing recently, to support National Health and National Education System was to establish regional campuses across the country. This expansion included Umnartcharoen – in the east, Karnchanaburi – in the west, and Nakornsawan – in the north. All campuses would be connected as a network, and technologies would be employed in this regard as a medium to transfer knowledge centrally to the peripheral sites, or vice versa.

The project had begun in 1997, and the high-speed network cable was implemented. That enabled all campuses in the University to communicate conveniently to each other. The FoN, in this situation, was embraced to move along with others and employed these new technologies. The Local Area Network (LAN) of the FoN was subsequently planned and installed. All faculty members were required to prepare their IT skills to exploit these technologies, and the Faculty was requested to provide the computer training programmes to support these. Budget had been allocated to upgrade all existing hardware, and purchase new hardware and software. Although Information Technology (IT) was first introduced to the FoN for administrative work, it subsequently expanded to cover other areas and progressively became a tool to increase faculty productivity and as a tool for teaching and learning.

Regardless of an emergence of the ICT in education that has introduced a remarkable change to Mahidol University, an increasing of flexibility in learning – anywhere and at any time – is of interest to the FoN and will be useful particularly in nurse education. It brings a potential for the Faculty to enhance their teaching and learning, keep the Faculty abreast in national nursing community, and possibly compete with others in an international level in the coming years.

It should be noted that this study had begun with an interest in tele-learning and subsequently has evolved into e-learning due to an exponential growth of demand in e-learning at national and international levels that became involved in a later stage while conducting the study. The changing of this demand along with the change in technology has transformed the concept of tele-learning and begun to unify other related terms to be more mature in meaning. The term 'tele-learning', hence, will be employed in the first half of the study, and the term 'e-learning' shall be introduced from Chapter 6 onward.

2. Objectives of the Study

The main goal of this research is to propose an implementation model of tele-learning, subsequently e-learning, that is appropriate for nurse education at the Faculty of Nursing at Mahidol University in Bangkok, Thailand. In particular, this thesis aims to:

- Investigate how theories of change and innovation can help informing an implementation of tele-learning/ e-learning.
- Explore an implication and successful factors of the implementation of tele-learning at the Faculty of Nursing at Mahidol University in Thailand.
- Propose an appropriate implementation model of tele-learning/ e-learning for nurse education in Thailand.

The main research questions for this study are:

1. How can literature in ICT, tele-learning, e-learning, and theories of innovation and change inform development of an implementation of tele-learning/e-learning?
2. What exemplars from the western countries contribute to the development of the model?
3. What is an appropriate implementation model of e-learning for nursing education in Thailand?

3. Benefits of the Study

Since tele-learning is a new concept of teaching and learning that uses ICT for educational purposes, implementing innovation in traditional institutions requires extensive and thorough preparation and planning. Lack of these may result in failure, or not much success, for the institution. Failure or unsuccessful implementation not only means that lecturers and students will not receive the advantages of tele-learning as the policymakers and implementers anticipated, but a high investment in terms of time and money will be wasted or meaningless. Findings from this research, and in particular the articulation of a model grounded in the local context for innovation, will assist institutional management, and the policy-maker in developing their plans, informing an appropriate direction, and bridging the gap between policies and practice in reality. Technological infrastructure, i.e. hardware and software, as well as all faculty members should be prepared for an implementation phase of the coming innovation in the next few years.

4. Research Design and Method

The study will be conducted using a case-study method. It is an empirical study that covers two main areas: tele-learning/e-learning and the institution, which in this case is the Faculty of Nursing (FON) at Mahidol University in Thailand. Units of analysis will be multiple units that comprise embedded units inside (Stake 1995). Multiple cases are used rather than a single case (Denzin and Lincoln 1994; Stake 1995). Case selection criteria are topical relevance, and related to feasibility and access. Data will be collected at a one-time effort (Stake 2000).

Phase I:

In Chapters 2 to 4, literature reviews regarding tele-learning, innovation, and change process, including change management, will be explored to develop a theoretical framework of an implementation model. In Chapter 5, a preliminary study conducted at the Faculty of Nursing (FoN) at Mahidol University will be illustrated to identify needs and understand the faculty's context. A small-scale questionnaire has been conducted as quantitative evidence. Also, other sources of evidence such as documentation, archival records and interviews, both structured and semi-structured, have been collected as qualitative data. Nurse educators, executive members, and people involved in Information Technology (IT) in the FoN were interviewed. Results from the preliminary study inform the study design in Phase II.

Phase II:

Two case studies have been conducted in this main phase. To be precise, two tele-learning projects were selected for exploration. Chapter 6 illustrates how projects were selected. Data collection protocol, to specify research instrument and procedures, were developed. Analysis and results are explained in Chapter 7.

Phase III:

The case study analysis leads to the modification of a model that was developed initially from literature reviews. Results from Phase II will feed back to the theoretical model from Phase I. The model shall be revised before putting in the FoN context since it was developed on a UK and European country basis. Interviews were conducted again at the FoN to explore the possibilities and accelerate an understanding of the movement of change in the organisation. This is illustrated in Chapter 8, along with results from the interviews that inform how a feasibility model should be designed, followed by discussion and conclusions in Chapter 9.

I should mention here that in addition to being a researcher in this study, I also had a role at the Faculty, and hence, inevitably became part of the story. I graduated from this Faculty and had been working at Siriraj Hospital for five years as a registered nurse in a Respiratory Care Unit (RCU). I returned to an academic career at the

Faculty, when I finished a Master's Degree in Computer Information System (MSc. CIS) and had a few years experience working as a programmer/system analyst at the Computing Centre of the Bank of Asia in Thailand. My academic position at the Faculty includes the responsibility of developing and teaching a Nursing Informatics Course for undergraduate students, establishing a Learning Resources Centre as an aspect of a technology centre, and a Computing Centre for all the faculty members. During the time of developing the technical infrastructure, and accelerating the IT literacy of academic staff and faculty members, it was ascertained that the Faculty was in an early stage of integrating IT in their teaching. It made me question how we could exploit IT in teaching and learning more than what we had, and what the future role of IT could be in the Faculty. With these small questions in mind, my research journey began.

It appeared that I had many roles at the time of conducting the study. Inside the story, I was seen as a change agent/change manager, who had been exploring an appropriate alternative for exploiting IT in a teaching and learning context. My concern was what we could be doing to make use of this technology to enhance teaching and learning. On the other hand, I was seen as an academic staff member who had teaching and research responsibilities. Alongside the story, I am a researcher conducting this study and have learned to shift between being an insider and outsider during different stages of the study. Having the Faculty as a case study, in a way it was an advantage being an insider. However, being physically away from the Faculty for sometime provided me an opportunity to learn how to detach myself from the Faculty context and become neutral when analysing and interpreting data.

5. Limitations

Since the method of this research is case study, case selection criteria will be considered a replication logic rather than sampling logic (Yin 1993). Generalisation can be accepted to theoretical propositions, but not to populations or universes. It should be clear that this is an analytic generalisation rather than statistical generalisation (Yin 1994). In addition, the implementation model from this study is based on the empirical data from UK/ EU cases, and is devised to fit into the FoN context.

Chapter 2: Tele-Learning

Communication technology increasingly plays an important role in our world. Currently, communication technology on computer networks, particularly the Internet and World Wide Web (WWW), not only enables people to communicate with each other faster and more easily, but also brings the potential for great change in education. Many countries have noticed the importance of these new technologies and have arranged new budgets for IT network infrastructures, which can be seen clearly from the national education plans of many countries. Harasim (1997) mentioned that

> "…one of the basic requirements for education in the 21st century is to prepare learners for participation in a networked, knowledge-based economy in which knowledge will be the most critical resource for social and economic development." (p.1)

As the combination of Information and Communication Technology, hereafter called ICT, enables the creation of new approaches and new opportunities for teaching and learning, many studies have been conducted and published about how technology can be used to enhance learning. Whether it is technology push or system pull, aims to exploit technologies are diverse, for example representing high performance; being viewed as a strategic weapon in a highly competitive world; or reducing geographical barriers and increasing flexibility of learning in terms of time and place. Whatever it is, when technologies are used for educational purposes, Harasim (1997) states that:

> "There is a critical need for rethinking education, with special focus on new designs for learning as well as new designs for the technological environments that can support enhanced cognitive and socio-affective activities." (p.1)

Technologies have been employed to serve educational purposes in different ways, in different combinations, and are diversely titled, for instance, tele-education, tele-learning, tele-teaching, telematics, online learning, Virtual Learning Environment (VLE), web-based learning, and the like. Although many authors use their own term and give their own definitions, the main concept does not differ much. What is

important is the integration of information and communication technology for use in education and the benefits of those technologies to increase the flexibility in teaching and learning, and, indeed, to enhance opportunities for active and collaborative learning. Other benefits are anticipated to follow the success of these implementations.

1. Involvement of IT in Education

In the 1960s, the preparation of guidelines for computing-related programmes at the baccalaureate level was initiated by the Association for Computing Machinery (ACM, 1965). At that time, the large, expensive, complex computers known as mainframes, which had been around for approximately fifty years, had played an increasingly important role in society. The breakthrough came during the 1970s, particularly in 1979 and 1980, and brought about a social and technological phenomenon (Collis 1993; Fuori and Gioia 1994). This heralded the age of the microcomputer or personal computer. The small size, nominal cost, and versatility of the personal computer allows the individual to work independently of mainframe computers. Collis and Moonen (2001) asserts "Society viewed this as a revolutionary and powerful new opportunity". Indeed,

> "Computers could revolutionize education, could even revolutionize the process of cognitive development of the child, and in more practical terms, could bring new competitive possibilities to schools" (p.40).

She called this event the first wave and named it the "computers-in-education wave", which started in the late 1970s and early 1980s. It was the wave of social and technological developments that stimulated interest in computers in many educational institutions (Merritt 1995; Couch 1996; Collis 1999). In the meantime, interest in the educational aspects of telematics, a combination of communication and information technologies, had occurred in parallel. People throughout the world could communicate to each other by using the capabilities of wide-area-networks and could access information in new ways via the Internet and applications such as email and the World Wide Web (WWW). The second wave started in the mid 1990s. Collis named it the "Internet-in-education" or "computer network applications in education"

or "information highway" wave. Although networks embracing the Internet had been employed in educational settings for many years, approaches to the network had never expanded extensively to other domains like this. The trigger of the World Wide Web (WWW) had introduced a broad scale social expectation, which had never happened before. It occurred in accordance with the breakthrough of telecommunication technology, which brought people to the network's world, or more precisely to the Internet's world (Couch 1996; Collis 1999).

Returning to the meaning of "telecommunications" and its components, the term "telecommunications" comes from the Greek word, *tele,* which means "far off". The Oxford Dictionary defines this term as:

> "Communications by radio, telephone, television, cable."
>
> (Hornby 1995, p.1227)

Fuori and Gioia (1994) emphasize that telecommunications is the transmission of information without changing the information. They define the components of a telecommunication system as the sender, the medium, the communication channels, and the receiver (Fuori and Gioia 1994). Some telecommunication systems are unilateral, from a single source to multiple sources. (Couch 1996). For instance, publishers, broadcasters, and motion picture producers dispense information and entertainment to multiple sources. Other systems are bilateral from person to person, position to position, or some combination of person and position (Couch 1996). The term "tele-" has been combined with other terms to create new words and generate new meaning. The term "telematics", for example, is a derivative of the French word *telematique*. It is a compound of *telecommunication* and *informatique* (Couch 1996, p.165).

The Division of Informatics at University of Edinburgh defines term "informatics" as

> "[Informatics] is the study of the structure, behaviour, and interactions of natural and artificial computational systems." and
>
> "The central notion is the transformation of information - whether by computation or communication, whether by organisms or artifacts" [1]

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[1] See: http://www.inf.ed.ac.uk/about/vision.html

In the Oxford Advanced Learner's Dictionary (Pollard 1994), the term has been defined as "the science of processing data for storage and retrieval; information science". Similarly, it is another subject of study that has been used to create other compound terms such as health informatics, nursing informatics, and even social informatics. Once it has been associated with term "tele-" to be "telematics", new meaning has been generated.

The term "telematics" was used firstly in 1859 when printing machines were attached to telegraph receiving units to make printouts. Telematics procedures transmitted information more rapidly and at less cost than traditional telecommunication ones. To use the telephone as a point of comparison, the telematic procedures would deliver "hard copy", while telephone conversations offered "soft copy" (Couch 1996). Osorio states regarding "telematics" that,

> "…[Telematics] is a hybrid word increasingly being used to describe the combined use of telecommunications and information technology. Terminology such as electronic communication, or communication and information technology are also often used, as is the word telecommunications" (Osorio 1996, p.342).

Similarly, Collis (1998; Collis and Fisser 1998) defines telematics as the combination of communication and information technologies, and extends it to cover network technology and software products from various sorts.

The prefix 'tele', when combined with other terms, for example tele-education, tele-teaching, tele-learning, has generated new terms with new meanings that relate to distance.

Concerning the trigger events that Collis has addressed, progress of Information Technology (IT) apparently varies in different places due to many factors. For instance, some organisations are facing, or have passed through, the second wave, while some may not have ever touched the first wave yet (Akker, Keursten et al. 1992; Barg, Robinson et al. 1992; Ely 1997). However, the notion that Collis intends to point out is an emergence of telecommunication technology in this decade. Couch asserts this and stresses the importance of telecommunication as:

> "...the obliteration of space has been the implicit objective of the developers of telecommunication technologies since the first postal system was put in place. Space has not been obliterated, but space is no longer the barrier to the sharing of information and sentiment that it once was."

He further writes that:

> "...Morse's telegraph was the first toddling step into the age of electronic communication; Babbage's analytical machine the first toddling step into the computer age. For almost a century the two technologies matured independently. They are now unified." (Couch, 1996).

2. What is Tele-Learning?

2.1. Definition:

Through the merging of Information Technology and Telecommunication Technology with education, standardized definitions of newly generated terms such as tele-education, tele-teaching, or tele-learning, are not yet currently in place. Individuals or groups, who set up tele-teaching or tele-learning projects in their own environments, tend to create their own definitions. Some define tele-learning as being no different than distance education; some narrow that definition, and refer to tele-learning as a certain form of distance education such as television-based distance education or Internet-based virtual courses (Collis 1999a). For example, the Swiss Federal Institute of Technology Zurich (ETH) has conducted the Teleteaching Project and defined 'teleteaching' as 'a synchronous Distance Education methods' (Hanni 1997). The project aims to substitute traditional TV-transmission in distance education with bi-directional transmissions of audio/video- and computer-oriented data over (fast) public telephone or data communication lines (including satellite connections). This method has been termed 'teleteaching'.

In 1997, Professor Betty Collis at the University of Twente in the Netherlands published her book "Tele-learning in a Digital World: the Future of Distance-

Learning". She uses the term "tele-learning" according to the Tele-learning Initiative at her institution, and provides its definition as

> "...Tele-learning is making connections among persons and resources through communication technologies for learning-related purposes."
>
> And... "It is taken as a general term to refer to the use of telematics applications for learning-related purposes". (Collis 1997)

Many publications regarding the tele-learning project at the University of Minerva have received much more attention from many institutions both in her own country and in other countries.

The term 'tele-education', used by Pelton, refers generally to the application of new technologies to education (Pelton 1990). Pelton looks at the possibilities of applying new technologies to distance education. Therefore, tele-education, in his sense, is a model of teaching using mainly telecommunications systems, whereby much of the teaching is through video (Jones, Kirkup et al. 1992). It is suitable for an institution that serves both a face-to-face community of students and a distance-education community of students. Lectures given face-to-face are also relayed to the students at a distance. Pelton views tele-education as having the potential for solving many educational problems such as reaching students in rural areas. His idea is concerned with applying two new technologies – satellite communications and fibre-optic cable:

> "Satellites are still best for broadcast distributions and for rural and remote access, while fibre-optics are well suited to linking centres of learning, university systems, etc. Fibre-optic educational networks are well suited on top of public telecommunications networks at a modest cost" (ibid. p.266).

His view of the role of new technology in education is its technological determinism:

> ...The key point to observe here is that the various electronic and photonic techniques are tending to merge in new and creative ways. Satellite communications are connecting to fibre-optics and terrestrial radio service in order to provide data, radio and video services.

> Educators of the twenty-first century will have all these tools and more to rely upon in designing good and responsive programs for every need group…(ibid. p.267)

Bates' responses to Pelton's view of distance education is that educators are needed to be leaders rather than technological idealists (Bates 1991). Bates refers to the third generation of distance education from Nipper's classification (Nipper 1989) that is based on the use of electronic information technologies, but uses such technologies to provide more two-way communication. Typical technologies are computer conferencing or networking and audio- and video-conferencing including audio-graphics (Bates 1991). He comments that Pelton's definition of 'tele-education' includes electronic technologies of a primarily one-way nature, such as broadcast satellites.

3. Media and Delivery Technologies

Many means of communication are used in tele-learning. It is the communication between teacher and students, among students, and among teachers. The forms of communication can be one-to-one, one-to-many, many-to-one, or many-to-many. For example, Osorio (1996) conducted his study to find out how telematics can be used to enhance the professional development of teachers. He classified types of telematics services into 4 groups, based on services available in his study at that period (Osorio 1996).

- Electronic mail for individual communication
- Computer conferencing for group communication
- Electronic resourcing
- Computer desktop and video conferencing

From Uskov's survey (1998), the most popular communication services were summarized as follows:

- Computer-based communication including network (Internet or web pages), electronic mail, and bulletin board systems/white boards.

- Video conferencing with one- or two-way and two-way audio conferencing via broadcasting, cable, satellite, microwave, telephone lines (up to 5-10 pictures/ min), and low power television (slow scan & compressed video).
- Telephone-based audioconferencing.

Other studies and projects combined such applications or services together to be their own teaching-learning methods and served their purposes. Some of the conclusions from media/delivery technology research revealed that it is not the technology alone that determines whether or not tele-learning is successful, but the way in which the technology is used (Schramm 1977). Therefore, designing courses for tele-learning, probably, combines many sorts of media and delivery technologies together.

Table 2-1: Sample of studies relating to media/delivery technology choices for tele-learning [Source: Adapted from Collis (1997)]

Study	Media/ Delivery Technologies	Major Focus
Stahmer, Bourdeau and Zuckernick (1992)	Print-, audio-, video-, computer-based technologies, multimedia	Strengths and weaknesses relative to implementation issues, including costs
Bates (1984b)	Audio cassettes, audiographic systems, video cassettes (from TV broadcasts), computer conferencing	Experiences from the Open University (UK), orientation to practical issues related to teacher and student use
Jones and Knezek (1995)	Comparison of traditional classroom instruction and 12 other delivery systems (from mail to videoconferencing)	Matrix of issues related to costs and access and modality; instructor and student variables
Watabe, Hamalainen and Whinston (1995)	Audio, audiographics and computer conferencing; shared network applications	Relating student learning activities to "off-line" and "online" learning
Eijkelenburg, Heeren and Vermeulen (1992)	Systems for communication, resource-sharing, group-activity support, and presentation-support	Relation to same- and different time, same- and different place for learning
Mason (1994)	Computer and video conferencing, audiographics	Choice based on variables related to learning style, course design, and context
Bork (1995)	Print, audio, video, teleconferencing, computers (low and high interaction, with or without multimedia)	Relative benefits of quality of learning, number of students, and cost per student
Charp (1994)	Print, radio, television, video, computers, audiographics, interactive television, satellite conferencing, computer communications	Comparison of use in countries and regions, including Africa, Japan, Thailand, Turkey, US, UK, Canada, and others
Romiszowski (1993)	Telephone, multimedia workstation and networks, audio-, video- and computer conferencing, audiographics, fax, email, CSCW environments, "virtual classroom"	Technical developments and costs related to phases in distance education
Pohjonen (1994)	Comparison of models of media selection	Relationship of media-selection models to learning models and to efficiency comparisons.

I will illustrate four of the delivery technologies, mentioned above, in the following section: electronic mail, broadcast television, small-group work and video conferencing, and computer conferencing.

3.1. Electronic Mail (Email)

Email systems are one of the well-known services on the Internet and have a broad range of applications. With these systems, users can create out-going messages, read and process incoming messages, and respond to incoming messages in a variety of ways. Email also has the ability to attach files to a message, open attached files that are received, and to forward messages, or edited versions of messages, to other recipients.

> 'Anyone who has a computer account can create and send information to anyone who has a mailbox on that computer or on other computer to which it is connected through a computer network. The network might be a local area network, or in different states, countries, or continents and connected via long-distance telecommunications that form a permanent network or a transient dial-up link' (Sproull 1993).

Sproull (1993) indicated that sharing computer terminals, or walking to computer rooms to get access, or learning a complex set of instructions to send and receive mail, could increase barriers to using email. It would be convenient for people who already had terminals on their desks. Email applications currently offer many features for users as a set of facilities. However, this not only depends on the email program used, but also on features of the underlying mail system and mail transport protocols.

The six characteristics of email that make it different from other communication technologies are (Sproull 1993):

1. Email is asynchronous. Senders and receivers do not need to attend to the same communication at the same time. They can read and respond at their convenience, which means communication crosses time as well as space.
2. Email is fast. It can be transmitted in seconds or minutes across a continent or around the world.
3. Email is text-based. Only a few mail programs allow pictures or other forms of media to be transmitted.
4. Email has multiple-receiver addressability. One can send a message to others wherever they may be.

5. Email has built-in external memory. All of the electronic messages can be stored and retrieved later.
6. The external memory is computer processable.

Some aspects of email related to tele-learning, such as 'editing', are particularly important in email systems. It means that 'cut and paste' functions can be performed between the electronic documents via clipboards. These capabilities increase possibilities for collaborative writing and other forms of work among participants. Another feature is that email allows us to send messages to lists of people through a single address. The distribution lists can be small and personal such as project members or a specific group in a course. The lists can be maintained via special software such as LISTSERVE or MAJORDOMO, all based on the standardization of addressing that is at the centre of interconnectivity with network systems and especially with the Internet (Collis 1997).

Advantages and Disadvantages

Email facilities provide communication among students, friends, and educators, whether formal or informal. It is flexible in terms of time and place. Senders and receivers do not need to communicate at the same time. Messages can be composed then sent for receivers to pick up at their convenience.

However, not everything is always perfect. Different email systems sometimes have trouble transmitting and opening messages. Besides, those communicating with this method need to have typing skills. People who are familiar with the keyboard will overcome this barrier easily. Although some email programs allow the transmission of video images or speech instead of text, the size of such e-messages will be increased and will take a longer time to upload or download (Lai 1997).

3.2. Broadcast Television

> "Broadcasting improves people's knowledge of the world, raises cultural standards and provides educational stimulation"
>
> (Bates 1984).

Broadcast television has been used in education for many years and in many countries. Today, broadcast television is mixed with other media, for example: combining a mediated presentation with short, informative video segments, or integrating a discussion into a documentary. Another way is to combine broadcast television with print media and sometimes with tutor support. Results from Bentley's study (1992) revealed that combining television with print material and tutor support moved from the last rank (12) into the third rank.

Broadcast television has been a solution in certain special educational conditions, such as widely distributed campuses or widely distributed students in distance learning universities. Broadcasting can be performed via cable or satellite.

Advantages and disadvantages

> "Television is peculiarly able to convey a way of experiencing the world, because it provides a vicarious experience through dynamic sound and vision, and uses a number of technical devices to manipulate that experience"(Laurillard 1994).

Moreover, it contains powerful rhetorical devices such as production decisions about what to film and where to point the camera, and the potential for establishing a point of view is clear. These are the advantages of television. However, broadcast television is a one-way communication; students cannot ask or respond to questions promptly. Some solve this problem by using email to take students' responses.

3.3. Small-group Work and Video Conferencing

Video conferencing is a one-to-many medium, making it a sensible way to provide access for many sites to a remote academic expert. At either end of a video-conferencing link there is a camera focused on an individual or group, which carries their picture via a video link to the screen at the other end. The video link may be high-band cable, ISDN, or radio microwave, and over long distances may be transmitted by satellite (Laurillard 1994; Zhang and Fulford 1996).

3.4. Computer Conference

Its environments have almost all of the functionalities of email systems plus the additional benefit of allowing designated groups of users access to common, shared data buses of previously-sent messages. It also provides a 'forum' for new activities and the opportunity to learn about IT and telematics 'skills', such as the use of email and computer conferencing, modem installation, and dial up connections.

Advantages and disadvantages

From the instructor's perspective, computer conferencing will gain advantages in terms of:

- Messages are automatically sorted into conference areas and can be further followed as threads
- The grouping of messages around a topic can facilitate communication visually as well as organisationally
- Conferencing software often includes history options, to allow the instructor to see who has read a certain message
- Conferencing environments generally support real-time chat, which may have some educational value and often has social value (Mason and Bacsich 1998)

In terms of disadvantages:

- Conferencing software may be separated, and have an extra cost from the ordinary email in an institution, having implications relative to support and access.
- Pre-selection of categories for messages often does not fit new themes as they evolve, or messages with multi-theme content.
- Having to check within a variety of conferences for new messages, and not knowing if there is a temporal or logical relationship among the messages in the different conferences can distort communication rather than enhance it.

4. New Methods, New Learning Environments

The determination of the delivery of IT-supported learning in higher education helps us understand the meaning of terms, which use information technology and communication technology to benefit teaching and learning in this decade. Models that are identified by Lewis (1991) which have implications for both distance education and open learning explain the difference of the delivery of IT-supported learning that will lead us to understand more of other learning styles. Lewis classifies models into four types, namely, the classical campus model; the Open University model; the open learning model; and the IT-based open learning model (ITOL-model). Details are illustrated as follows:

1. ***The classical campus model.***
   Students are present on campus for their lectures, seminars, and laboratories, and the like, and campus provides resources via a campus network.

2. ***The Open University model.***
   The delivery of courses mainly through self-study paper materials and making little general use of computer technologies. Lewis mentions proposals for international open universities in Europe and in particular satellite-based projects as examples for this model.

3. ***The Open Learning model.***
   An important aspect is that software development and thus the associated high cost of development is not an issue. Lewis addresses the EuroPACE (Van den Branden and Van der Perre, 1997) project as an example:

   > "The project is supported (and supports) major European high-tech companies by making available advanced seminars in science and technology. Programmes are transmitted by satellite, and followed up by computer conferences involving the programme's presenter. The communities of learners are very specialized, and for this latter reason, share a common culture which to some extent transcends the problems of a national language and culture mentioned earlier as a stumbling block to international collaboration in the use of learning technologies." (Lewis, 1991)

4. ***The IT-based Open Learning model (ITOL-model).***

Lewis sees this model as an alternative to the other three. He outlines a model for ITOL that

> "(ITOL Model)...allows any individual to communicate with a tutor or tutors (most likely university based people, but not exclusively), with other learners and with a series or collection of both university and non-university based resources. In addition, learners may have available to them a counselor from outside the university system, most likely someone from inside their own organization. Finally, there is a university based resource manager with whom learners can also communicate." (Lewis, 1991)

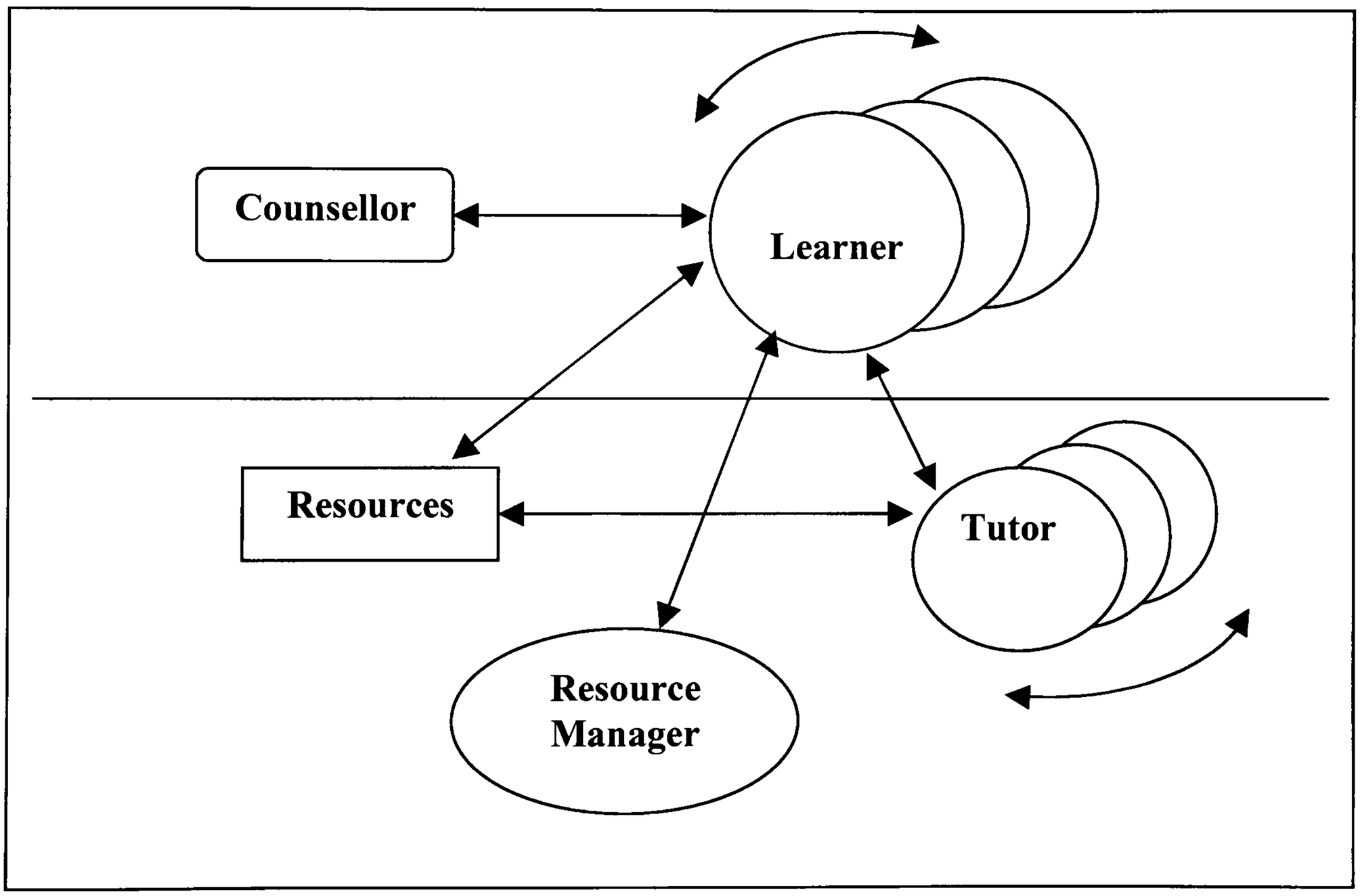

Figure 2-1: The ITOL Model

Formerly, ITOL was a research project (McConnell, 1994) funded by the UK Training Agency (Employment Department), which looked into the feasibility of providing an electronically mediated open learning provision. The stated aim of this feasibility study was:

> ...to improve the flexibility and responsiveness of vocational education and training provision in Great Britain through producing a

plan for the creation of information technology based open learning provision alongside established practices in existing universities.

The aim of the study was to develop a model of information technology-based open learning, which came to be termed ITOL, which was feasible and could be implemented immediately. The model would define how we could employ desktop computers, modern communications technology, and online educational computing in the provision of up-to-date, relevant, and supportive forms of open learning for people geographically distant from each other and from the university (McConnell, 1994). Benefits of this project, from users' perspectives, are:

1. Time and space barriers are removed.

   Because of the flexibility of ITOL, learners who have computers, modem and appropriate software linked to the public telephone system, can connect with ITOL and can learn at times and places convenient to themselves – 24-hours a day, seven days a week, all year round.

2. Learning barriers are removed.

   With ITOL, learners are allowed to define their own learning and personal development needs that cannot be met in the conventional education system.

The ITOL model, as shown in Figure 2-1, includes objects and actors within a bounded ITOL system, which is developed and made available by the host ITOL institution. This contains the resources for learner use and other facilities for accessing this system. Fundamentally, ITOL is a model that allows a learner to communicate with a tutor, tutors, or facilitators, with other learners, and with a series or collection of both university and non-university-based resources. Tutors normally are academics or other subject specialists, who will help the learners think through their issues of concern and may answer their queries and questions. In this model, the learner may have counselor who can offer assistance in planning a learning programme and be in a supportive role to the learner. Another actor in this model is the resource manager, who performs decision about resources, makes them available, and puts them in the system for learners to access, including maintaining records of resources. In addition, a system manager and technical advisor are required to

support learners and tutors. The system manager will have the responsibility for making the system run effectively, while the technical advisor will sort out problems and difficulties regarding accessing the system and using its facilities.

Gardner (1991) criticizes this assumption as being based on a false view of higher education:

> "It (ITOL) explicitly attributes to higher education a vocational education and training function, which many would suggest should more properly reside with other areas of non-advanced further education, or indeed wholly out with the state education system."

Jones and Kirkup (1992) comment that ITOL assumes that learners are able to determine their own learning needs, and are competent to structure the resources they have accessed and can direct their own learning. It seems too optimistic to expect students to learn and use computers in this way (Jones, Kirkup et al. 1992). However, there are some features, which can be used further in 'education and telecommunication'.

5. Examples of New Methods

Bringing the benefits of information and communication technologies into education clearly increases flexibility in teaching and learning. At present, many institutions have integrated some advanced technology into their teaching and learning courses, and some have put those into a new learning environment. I will concentrate on four of them that relate to my study. They are:

5.1. Distance Education and Open Learning

5.2. Computer-Mediated Communication (CMC)

5.3. Flexible Learning

5.4. Network Learning or Collaborative Learning

5.1. Distance Learning

Bates (1991) observes the following about distance education:

> "Distance education illustrates well the relationship between the use of technology and the need to re-organise to maximise its benefits. It also illustrates the capacity to reach new target groups, and to expand the range of educational provision, through the use of technology, when properly organised and structured."

The two terms 'open learning' and 'distance education', are often used to mean the same thing, although there are differences.

Open learning is primarily a goal, or an educational policy: the provision of learning in a flexible manner, built around the geographical, social and time constraints of individual learners, rather than those of an educational institution.

Distance education is one means to that end: it is one way by which learners can study in a flexible manner, by studying at a distance from the originator of the teaching material; students can study at their own time, at the place of their choice (home, work or learning centre), and without face-to-face contact with the teacher. (Bates 1995, p.27)

The Pennsylvania State University in the United States (Innovation in Distance Education, 1999), defines 'Distance Education' as

> " an educational system consisting of the methodologies and technologies that support learning when the learner and learning resources are separated by time and/or space." (p.5)

The Distance Education Subgroup of University of Wisconsin defines this term as:

> "Distance Education is defined as a planned teaching/learning experience that uses a wide spectrum of technologies to reach learners at a distance and is designed to encourage learner interaction and certification of learning."[2] (University of Wisconsin – Extension, Continuing Education Extension, Distance Education subgroup)

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[2] See: http://www.uwex.edu/disted/definition.html

Open learning, therefore, is a broad term that may include distance education, particularly some forms of learning that cover a mix of independent study and face-to-face teaching. However, the degree of openness, accessibility, and issues of 'distance' should be taken into account.

The Open University (OU) in the United Kingdom (UK) is an example of the university that has the main educational concepts of distance teaching, open access, and open learning. It was established with an expectation that broadcasting would be the main teaching medium. Although broadcasting (more recently video) is an important component of the teaching system, the body of the teaching material in almost all the courses has always been hardcopy text, delivered to students through the regular mail services (Jones, Kirkup et al., 1992). Many systems and institutions have based themselves on the UK OU model, for example the Open Universiteit in the Netherlands and the Indira Ghandi National Open University in India. A traditional definition of distance education given by Perry and Rumble (1987) was:

> For education to occur there must be someone who needs educating and someone to do the educating. This implies that there is both a learner and a teacher, and some form of two-way communication…In the context of education, distance means that the learner and the teacher are not face-to-face. Thus, two-way communication must take place despite the fact that they are not in the same room together. Two-way communication can be established using any medium that is available. (Perry and Rumble 1987, p.1)

In terms of location, it can be seen that students study by themselves, and they are separated from their tutors and from each other. The main teacher, for them, is the course material. However, the results from many studies reveal that valuable education occurs when students interact with each other, and sometimes they learn from one another, with and without tutors. It appears that the value of face-to-face teaching is still needed, including the interaction. Thus, the next generations of distance education should try to alleviate these problems. There are 3 generations of distance education (Nipper, 1989; Bates, 1995).

1. The first generation is characterised by the predominant use of a single technology and lack of direct interaction between students and the teacher

originating the instruction. A typical form of this generation is correspondence education.

2. The second generation is characterised by a deliberately integrated multiple-media approach with learning material, which has been designed specifically for study at a distance. Two-way communication is used in this generation but still mediated by a third person: a tutor, rather than the originator of the teaching material. The examples of this generation are autonomous distance teaching universities.

3. The third generation is based on two-way communication media that allows direct interaction between teachers and students. This could be between remote students and the teacher originating the instruction and between remote students either individually or as groups. In this generation, technologies increase the distribution of communication between student and teacher, and between students. This generation is viewed as leading to new types of educational organisation.

5.2. Computer-Mediated Communication (CMC)

The term Computer-Mediated Communication (CMC) embraces a number of systems that allow the users of linked computers to communicate with other users. It supports one-to-one, one-to-many, and many-to-many communications. It is seen as having the potential to overcome distance learners' feelings of isolation (Austin 1995). Kaye, Mason and Harasim (Kaye, Mason et al., 1989) list the general facilities of a CMC system as including:

- electronic mail for one-to-one communication
- one or more forms of asynchronous group communication (conferences)
- a 'chat' mode for real time exchange of short messages with other users
- a directory of all users, with their resumes and information on when they last accessed the system
- a directory of all listed conferences, with brief details of each one
- an online editor and a 'scratchpad' for message composition
- facilities for file upload and download

The conclusions from many CMC projects show that students find it motivating, and they are willing to spend more time on tasks than required from the teacher. Teachers also perceive that learning value has occurred (Collis 1992; Riel 1992; Collis 1993; Waugh, Levin et al. 1994; Austin 1995).

5.3. Flexible Learning

Waterhouse (1990) explains the goals of flexible learning in terms of the needs of society and of the individual learner and that the needs of the individual are divided into individual differences and autonomy. He discusses some systems of flexible learning, which are based on a broad student-centred philosophy, and his selection is confined to the UK and to the last two decades. These systems are resource-based learning, supported self-study, open access workshops, open learning (institution based), and distance learning. He also points out that there are a variety of terms to define different systems or methods in teaching and learning, so "instead it might be more valuable to concentrate simply on **good teaching and learning** and to give some idea of its desirable attributes." (Waterhouse 1990). He identifies the attributes of good teaching and learning as follows (*ibid.* p.72):

- **A variety of styles and techniques are regularly used**. This would, therefore, include inspiring whole-class teaching, as well as well-organized small group and individual work.
- **Arrangements**, which create the environment for teaching and learning, are flexible with the needs of the student constantly at the fore.
- The **resources,** which provide the data and stimuli for learning, should be drawn from as **wide a range** of sources as possible.
- The **teacher** should create frequent opportunities to work **personally** with students in very small groups in order that his/her example and influence should be maximized.
- In every way, the work within classes should be **student-centred**, and flexibility should be used in order to achieve this.

He concludes that "What they call it is of less importance that what they actually do."

5.4. Web-Based Learning

In accordance with the Internet and that WWW, which increase flexibility in teaching and learning, the WWW has been shaped from being a publishing tool into a new learning environment. This method of learning, sometimes, has been called different names, for instance, online learning, network learning, or even collaborative learning. The design and method of approaches are based on educational principles, such as active and collaborative learning and knowledge building. Collaborative or group learning refers to instructional methods in which students are encouraged, or, perhaps required, to work together on their learning tasks. This method of learning will differ from the teacher-centred model where the student is viewed as passive receiver. Conversely, collaborative or group learning is based upon a student-centred model that views the student as an active participant. Harasim (1997) explains that this method of learning will facilitate greater cognitive development in the student than when he/she works alone.

In terms of knowledge building, it can be seen clearly that this new method of learning motivates students to increase participation, and to create, share, and organize ideas and information. In addition, this new approach also promotes multiple perspectives through reading input from other students in virtual communities, including the teacher's perspective as well. For this reason, Harasim states that:

> "knowledge according to this view is something that emerges through active dialogue, by formulating ideas into words and building ideas and concepts through the reactions and responses of others to these formulations". (p. 2)

However, it should be noted that the WWW has been developed as a teaching and learning tool based on different educational principles as stated above. In fact, the WWW has possibly been perceived as something fashionable and modern, and has now turned out to be just a virtual resource to store learning materials for sharing in the learning groups. Other methods and technological tools have not been integrated into online courses yet. Despite having other methods and technological tools, these have not been integrated into online-courses yet. They still employed traditional

methods in a new learning environment, and considered that they were conducting 'Web-Based Learning' course.

Harasim summarises significant outcomes of this model based on her data collection of over ten years of application of this approach to graduate and undergraduate courses delivered both entirely and partially online as: student participation is demonstrated in high rates; group interaction among students has been perceived as motivating; and intellectual exchange is of high quality. .

However, this method of learning still has some problems, as identified by Harasim (1997), for instance: lack of customized tools to support instructional activities, lack of customized tools to support learning activities, and lack of customized tools to support design and integration of multimedia. It should be considered that all the problems that she mentioned are concerned with course development tools only and exclude teaching, learning, and knowledge building.

6. Course Delivery System

An initiation of the networked learning has created a new demand for teachers and students to have a new learning environment that could facilitate this work, embed essential tools to support teaching and learning activities, and not be too complicated for them to use. A type of specific software, web-based application using standard Internet protocols, has been developed to serve this demand. Having this kind of application, users could access their courses by using a common web browser, for example Netscape Navigator or Microsoft Internet Explorer. It was intended to deliver entire courses to remote students, or to be used as a supplement to classroom-based education. A variety of terms have been employed to refer to this type of software, for example the Integrated Distributed Learning Environments (IDLE), Web-Based Tool, Web-Course Tool, Virtual Learning Environment (VLE), Learning Management System (LMS), and so on. Currently, a number of products appear on the global market. Although core functions share commonality, each product has a different design and provides users with different features on different system platforms. Among them are the following:

Table 2-2: List of Virtual Learning Environment (VLE) Systems

List of VLE
1. FORUM (by Forum Enterprises)
2. Virtual-U (by Virtual Learning Environments Inc.)
3. LearningSpace (by Lotus Corporation)
4. Learning Server (by Data Beam)
5. TeleTL (by University of Minerva)[3]
6. Web-CT (by University of British Columbia)
7. Blackboard (by Blackboard Inc.)
8. Symposium (by Centre Corporation)
9. First Class (by SoftArc Inc.)
10. Top Class (WBT Systems Inc.)

Comparative information for all of these applications will not be included in this study. However, two of them, TeleTL and WebCT, will be chosen for further elaboration, since these products had been employed in the two cases of the main phase.

It should also be noted here that the term VLE, Virtual Learning Environment, will be used in this study to refer to a type of software for managing online learning environments and as a course delivery system.

7. Advantages and Disadvantages

7.1. Advantages

There are four areas where tele-learning can be employed.

a. Support communication among people

Tele-learning has the potential to increase social interaction among students and increase coordination among university staff (academics, administrators, and technicians). In addition, it creates opportunities to share experiences and concerns, as well as anxieties.

b. Provide access to information resources

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[3] Pseudonymes have been applied to these names.

Having employed tele-learning, users are able to access information resources remotely, for example library, online databases, from anywhere, whether they are on-campus or off-campus, and at their convenience.

c. Support teaching and learning activities

Tele-learning can provide support for new, flexible, online teaching and learning activities, for instance, face-to-face seminars with online 'hands-on' activities; online seminars; facilitating students in submitting assignments; synchronous or asynchronous discussion (Tyler, M., 1998); asynchronous supervisory conferences; and discussion of clinical problems over video conferencing or computer conferencing session (Mason and Bacsich, 1998)

d. Provide a new form of teaching and learning and resources

Tele-learning, as stated in the web-based learning, has introduced a new form of teaching and learning and has encouraged teachers to provide new teaching resources. It has simultaneously brought about the need for adaptation in the way teaching is performed.

7.2. Disadvantages

a. Require a large investment.

Employing tele-learning will require a large investment, not only financial but also in time and human resources.

b. Require appropriate technical infrastructure and technical support.

Upgrading and implementing a technical infrastructure to an appropriate platform is required to create a new learning environment and facilitate learning activities. It is essential to have technicians to provide sufficient technical support and maintain the system so that it runs smoothly.

c. Language barrier.

Language barriers may occur for teachers or students whose English is not their first language, as English is implicitly accepted to be an international language on the Internet.

d. Not suitable to all courses.

It may not be appropriate for all clinical related courses, particularly in practical skills in medical and nursing courses that require interactions with patients in an

actual situation. This point should be considered and taken into account if tele-learning will be employed in these courses, and appropriate instructional design may be required when developing and implementing the courses.

8. Change of the Virtual Learning Environment (VLE)

In section 6 of this chapter, I have discussed the course delivery system, known as Virtual Learning Environment (VLE), and have illustrated these with a list of commercial software. Each VLE combines different communication tools in the system, hence creating an impact on learning design and how students interact with learning in the new learning environment, although communication tools for both synchronous and asynchronous use are always among the components embedded in the VLE.

When I began data collection in 1999-2000, VLE was very premature. Publications and reports from studies and projects related to VLE, tele-learning and e-learning were hardly found. It became more mature a few years afterward (Britain and Liber 2004), and the publications are now visible and accessible online. Evidence from a UCISA survey ascertains that the VLE's uptake by UK institutions in Higher and Further Education (HE and FE) has been increasing from 7% in 2001 to 40% in 2003 (Browne and Jenkins 2003). The VLE phenomenon here can imply the dynamic process of innovation and, perhaps, can inform us regarding how we should approach the dynamic of change, particularly when it has been introduced into academic environments.

In this section, I will explore the development process of VLE and illustrate how this may relate to an approach of innovation in organisation, from in-house development to commercial development – the difference in starting points of the innovation; limitations of an early stage of VLE design; and how VLEs have been employed in academic environments. Issues about VLE and pedagogy will also be addressed, including the current situation of VLE, which may reshape the future direction of the development of VLE in HE and perhaps elsewhere.

In the early part of this chapter, I also raised an issue about the unsettled definition of the term "tele-learning". Having mentioned the method of integrating technology to serve educational purposes, I referred to other related terms that appeared during the time, for example telematics, online learning, flexible learning, web-based learning, and finally e-learning. Within these terms, there are components of communication tools for individuals and group use, for example email and computer conferencing – for the former one, videoconferencing, and for the latter, broadcast television. Combining the selected tools to form a communication component in VLE has created new terms to call this form of learning, for example open learning, distance learning, flexible learning, network learning, and so on. As a breakthrough in telecommunication technology, Internet technology has been increasing rapidly. The growth of this kind of digital technology has gradually overshadowed old-fashioned broadcasting technology, which required a large investment of large physical machines and well-equipped studios, and which has now been replaced by equipment with access to the Internet and the WWW. Terms with the prefix "Tele-" that usually refers to broadcasting technology, have progressively been replaced by terms preceded by the letter 'e', which stands for "electronic". With the prefix "e" so prevalent in email, e-card, e-commerce, e-library, the term "e-learning" was born, became popular, and is now recognisable in the academic environment and elsewhere.

In e-learning, communication tools have been employed as the major components in a new learning environment in order to enhance learning interaction, encourage participation, and increase learning flexibility in terms of time and place. To simplify this process, a kind of web-based application to support course development online was created and was eventually called "*Virtual Learning Environment*" (VLE). JISC defines this term by referring to the components in which learners and tutors participate in "online" interactions of various kinds, including online learning (JISC Briefing paper no.1). Another interesting definition from an online dictionary gives this description:

> "A virtual learning environment (VLE) is a set of teaching and learning tools designed to enhance a student's learning experience by including computers and the Internet in the learning process. The principal components of a VLE package include curriculum mapping (breaking curriculum into sections that

can be assigned and assessed), student tracking, online support for both teacher and student, electronic communication (e-mail, threaded discussions, chat, Web publishing), and Internet links to outside curriculum resources. In general, VLE users are assigned either a teacher ID or a student ID. The teacher sees what student sees, but the teacher has additional user rights to create or modify curriculum content and track student performance. There are a number of commercial VLE software packages available, including Blackboard, WebCT, Lotus LearningSpace, and COSE."[4]

Managed Learning Environment (MLE) is another term that should be clarified here and should not be confused with the term VLE. The concept of MLE derived from the need to link VLE with existing institutional information systems[5], or at least to share data among systems that already existed. MLE, hence, was a concept to unify the systems running in institutions by bringing them together to share information and resources under the same platform, and MLE was the term used to describe this system. With this concept, VLE is obviously seen as a subsystem under this framework. JISC defines this as:

"…the whole range of information systems and processes of a college or university (including its VLE if it has one) that contribute directly, or indirectly, to learning and the management of that learning.

…There is sometimes confusion between a VLE and a MLE. The term Virtual Learning Environment (VLE) is one possible component of a MLE: it refers to the component(s) within an MLE that provides the "online" interactions of various kinds, which can take place between learners and tutors, including online learning." (JISC MLE)[6]

Although JISC intends to have an MLE as an integrated system that can transfer data between institutional information systems and VLE an MLE Review report, funded by JISC, indicated that there were gaps between these two systems in terms of

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[4] See: http://searchsmb.techtarget.com/gDefinition/0,294236,sid44_gci866691,00.html

[5] Some references have called this MIS (Managed Information System), and refer to information system applications that already existed in academic institutions.

[6] JISC – "Overview of MLE issues and how JISC can help", http://www.jisc.ac.uk/index.cfm?name=mle_overview

interoperability on both content and technology. Suggestions have been made to the institutions to develop a technological framework that will support future development of these systems so that they function together appropriately. However, this is rather ideal for some institutions since several factors are required to put these in place, for example flexibility of the technological framework, support from institutional policies, budgeting, and the like. In the meantime, questions in terms of technical support and capacity of the technical team of the academic institutions have also been raised, and the cost of maintenance and the staff's role in managing the system have also been addressed. I will discuss these issues later in the chapter, and I will include the development of interoperability standards for sharing information among applications within the large system in the final part of the chapter.

The process of developing meaning of the VLE, along with confusion of its meaning reflects that VLE, at the time, was in an early stage of the development process. It also appeared in this study when I wrote about VLE in Chapter 2, and I referred to it by using the term "**Web**-**C**ourse **T**ool", which was employed afterwards by WebCT to refer to VLE. Since the situation has now changed, and the term "VLE" has been used to convey the same meaning, I will use the term "VLE" from now on to reduce confusion that may arise from the literature review and other reference materials that we will discuss further.

9. Why VLE?

In fact, the right question should be why e-learning, since institutions have different purposes for implementing e-learning, as illustrated in Chapter 7, and VLE is just a tool in e-learning that provides teachers and learners flexibility in learning and can potentially enhance the learning process. It has also been developed to support a new form of learning. VLE, in fact, is an application running on a server-based system and comprises principal components to accommodate teachers in developing learning courses, tracking student progress, encouraging participation in learning activities, and supporting assessment. From the student side, the system will comprise tools that accommodate student learning, for example providing course details; class lists; a calendar; email; communication tools for participating with other learners and communicating with teachers; progress records; and other learning activities.

Implementers believed that by using VLE, technology could help enhance the learning process, increase learning flexibility, and support different learning styles.

A compiled list of VLE, both commercial and in-house development systems, as illustrated in Table 2-2, represented a list of systems that appeared in the marketplace during 1999-2000. There were about 8-10 market-led software products, and among those, WebCT and Blackboard obviously dominated the market. I will not talk about Blackboard here, but shall highlight WebCT and TeleTL from the list since they were used in the two case studies, Primrose and Minerva. During the time, WebCT was an off-the-shelf product from a commercial company, although it was initially developed in and academic environment[7] in 1997 and turned to be a commercial product a year later. In the Primrose case, licenses were purchased licenses to implement WebCT on the university system when the software was in an early version. TeleTL, at that time, was an in-house development system from the University of Minerva. Minerva had established a project called Tele-Learning and within the project, they had developed TeleTL as a tool for creating and managing online courses. We shall see similarities and differences between these two from the initial stage when the VLEs were first considered by the academic institutions, and how they were implemented and used in the institutional context.

10. Introducing VLE to Institutional Environment

As an innovation, VLE has introduced a new way of teaching and learning. It is not through the technical infrastructure alone that VLE became involved. In fact, it has created a cultural shift within the institution. Teachers and students are required to have new skills to make use of this tool. Despite having teachers and students, VLE is unable to work without multi-disciplinary team members who are involved in developing courses and maintaining the system, for example content specialists, instructional designers, graphic designers, programmers, system administrators, and the like.

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[7] The development of WebCT was started at the University of British Columbia Computer Science Department, Canada, in November 1995.
See: http://www.umass.edu/webct/instructor/about/history.html

As a course development tool, VLE is a way of exploiting technology to enhance the teaching and learning process, but users seemed to misunderstand when it was first delivered and thought it would come to replace face-to-face learning, or that mapping traditional learning courses in electronic format and putting them online could enhance learning. Perhaps the technology of the VLE obscured the purpose of the VLE, and rather shifted the purpose of using VLE from a pedagogical-focus to a technological-focus instead.

However, introducing the VLE to the institutions is not just selecting a VLE and then installing it on the university systems. In fact, choosing the VLE is merely a step within an implementation process of an e-learning project. Preparation before and after having VLE is essential, but usually found to be overlooked. Identifying institutional needs and user requirements are vital and should not be ignored.

Evidence from the two case studies has illustrated clearly that implementing innovation requires appropriate technological equipment and t system infrastructure as a working platform. Existing systems should be examined in order to inform the decision. The process of selecting VLE, whether buying or developing it, is a classic example. Buying the commercial software without consultation is unlikely to result in cooperation or acceptance from users due to a lack of sense of ownership. Having an in-house development system provides an opportunity to bring users into the development process and gives them a sense of ownership. Studies from FERL suggest that having users involved and participating in the decision and development process can alleviate resistance to change and helps increasing adoption rate. In other words, many groups of people in the institutions, for example executives, project leaders, implementers, teachers, and students, should be involved in the preparation process. However, having VLE on the system is one thing; using VLE is another. Users need to be prepared to learn new skills, and in many cases, learning those skills has taken time and will not happen immediately.

To avoid a mistaken decision when choosing VLE, implementers might launch a small pilot test first, and if successful, they can expand this further into a mainstream. This also happened in the two case studies, Primrose and Minerva. In Minerva, they had a very short pilot test but had strategies and policy support to implement across

the university in a few years time. In contrast, Primrose stayed in pilot test stage quite a while before the university decided to adopt this innovation across the institution.

The initial changes that VLE causes usually appear in administrative work, for example in course outlines, registration, classrooms, online assignment submission, e-documents, assessment, lecture times, or fieldwork. These initial changes give students some flexibility in the learning process. Although the changes may not precisely relate to pedagogy or make dramatically change learning, they can provide concrete evidence of success to administration and perhaps users in general. It may sound like policy or a strategic approach, but since change does not happen quickly, these small, visible steps have proved able to convince institution members to further carry out the adoption.

11. Making the Right Choice: Commercial, In-house Development, or Open Source VLE?

VLEs in these two case studies, although similar in terms of general purposes, are different in terms of the development process and the features of the end-product. The Minerva case chose to develop their own VLE in order to serve specific requirements in their institutional context; whereas, the Primrose case decided to employ a commercial product, WebCT, at their school. This choice was due to the limitations of their circumstances.

11.1. Commercial Products

Using a commercial product, for example WebCT, has an advantage in that it is simple and quick to implement. The institution requires no specialist support team to handle this load. Technical support and maintenance service can be purchased as an extra service from the software company and can be included in the annual contract. Obviously, the system can be up and running in a short time, and extra services are available for the institution should they be needed. To conform to institutional policies and have budget allocated for this, the institution can choose to transfer maintenance service to the company rather than increasing the workloads of the institutional technical staff.

In general, the product that comes with the default setting can serve general requirements to a certain extent. However, users prefer to be able to customise it to serve specific requirements. An in-depth customisation usually happens when users are familiar with what they have been doing and begin to understand their own needs. However, customisation can be restricted due to copyright restrictions. With this limitation, concerns for the institution to integrate VLE within the MLE and link with the existing systems of the institutions have been raised. There is no doubt that the commercial company that holds the copyright is the one hat can modify the product, if required. Additional costs in relation to the modifications could implicitly be incremented on top of the annual licence fee. Currently, issues regarding software license, licence fee, and copyright issues have generated interest among academic people.

Another concern is the capability of the VLE to share information with other related systems. It is an issue on the subject of system compatibility with other VLEs and other MIS applications. For instance, course modules developed on WebCT cannot run on Blackboard and vice versa. Content locked up in the VLE, or which is not transferable to relevant systems outside VLE, could make users worry about deciding to use VLE.

11.2. In-house Development System

Unlike a commercial development system, an in-house VLE, which may require a longer development time, can be designed and fine-tuned to serve requirements in specific institutional context. It is clear that one system cannot fit all. Each institution has a specific context and culture, and requires the general system setting to be configurable and customisable to serve those specific requirements. It is likely that designing a system to serve institutional needs and users' demands can increase adoption rate. Again, user participation in the development process can create a sense of ownership and can reduce the resistance to change (Rogers, 1997). Peer-to-peer persuasion is vital in the final stage of the decision process when adopting the innovation. Additionally, issues concerning copyright and license fee will not be a problem in this case, since the copyright will be with the institution. This will give the institution the flexibility to modify the system when required.

However, having an in-house development system requires that the institution have a technical team to handle this specific job, as well as maintaining it after the development is over. Since the system is unique, and general support in the commercial market may not be applicable, the administration should consider the development and maintenance cost if they are going to choose this alternative.

11.3. Open Source VLE

Open source VLE is a third alternative in this case. It eliminates problems in terms of license fees, technical capacity to develop a new system, and rights to customise. In brief, Open Source Software (OSS) is software developed by individuals or groups of people who may come from different organisations but have the same common goal. The software still has a copyright, but holds a license, mostly General Public Licenses (GPL), that gives users the freedom to run the program for any purpose, to study and modify the program, and to redistribute copies of either the original or modified program without having to pay the previous developers. The UK e-government has developed policies relating to Open Source which can be found in the publication "Open Source Software Use within UK Government" Version 2 on 28th August 2004, and defines term Open Source Software (OSS) as:

> "OSS is software where the source code (the language in which the program is written) is freely distributed with the right to modify the code, and on the condition that redistribution is not restricted, and indeed is obtainable for no more than the reasonable cost of reproduction" [8].

Results from JISC-OSS Watch survey (2003) in Higher and Further Education in UK indicate that cost is the main reason for academic institutions to choose OSS, rather than the proprietary software. The number of academic institutions deploying OSS has been increasing in the last few years (see OSS-Watch Survey Report, 2003), and a number of software programs developed under OSS are now becoming popular. A number of open source VLEs have also been launched and are freely available to download on the Internet (See list of VLE from Edutools website[9]), for example

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[8] A fuller definition of OSS by the Open Source Initiative (OSI) is available at http://www.opensource.org/docs/definition.php

[9] Edutools website: http://www.edutools.info/courses/

Boddington[10], Moodle[11], and so on. These provide alternatives for academic personnel to employ VLE either for their own interests or their institutions. The problems of employing proprietary software remain unresolved, for example the problems of content locked within the software, and being unable to transfer from one platform to another[12], such as between WebCT and Blackboard and has led academic personnel to look for alternatives and making open source VLE their solution.

12. Conclusion

My understanding about tele-learning has gradually changed. Regarding the definition of tele-learning by Collis, to me it is a very broad term that seems to cover everything related to learning. From that perspective, technology seems to be a major focus, while pedagogy is less of a concern. Harasim, on the other hand, defines tele-learning in terms of network and collaborative learning; her explanation and online model bring together teaching, learning, and technology.

The tele-learning in this study covers network or collaborative learning. Additionally, its focus is on higher education and based mainly on the computer or digital form. Tele-learning, from my perspective, includes both synchronous and asynchronous technologies and is not limited by either time or place.

In my opinion, the concept of tele-learning is very interesting, particularly in increasing learning flexibility. Nursing students are required to have clinical practice with real patients in real situations and be a part of the health teams during the morning, afternoon, and night shifts. They are also required to attend classes that are usually organised during office hours; the flexibility of tele-learning has the potential to minimise this problem.

In addition, policy to double the number of qualified nurses to support the National Health System in Thailand had implicitly influenced the Faculty's strategic plan and direction. An impact from this policy had affected the Faculty in terms of *place* –

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[10] See Bodington: http://bodington.org/index.php

[11] See Moodle: http://moodle.org/

[12] There has been a problem of transferring courses developed on WebCT to run on Blackboard, and vice versa (see: Britain and Liber, 2004). However, in October 2005, Blackboard took over WebCT Company, and in February 2006, Blackboard had announced the completed merger (see: http://www.blackboard.com/webct)

lecture rooms; *time* – class schedule; *human resources* – number of academic staff, *equipment*, and so on. Some of those can be prepared, and expandable, while some may not. IT, or perhaps tele-learning, had raised an expectation in this regard and was anticipated to be a solution to these kinds of problems.

Finally, Mahidol University, has a plan to expand campuses to other regions, and tele-learning may be a solution to sort out geographical problems.

A simple question is "How?" How can tele-learning be implemented at the Faculty of Nursing at Mahidol University? Are there any models or any patterns that can guide us to do so? This has led me to address the question: What is an implementation model of tele-learning for the Faculty of Nursing at Mahidol University in Thailand? Further exploration will be illustrated in the following chapter.

Chapter 3: Background and Organisation of Faculty of Nursing

1. Introduction

This chapter provides background of the Faculty of Nursing (FoN) at Mahidol University in Bangkok, Thailand. To understand the context of the FoN, I shall begin with the context of Thailand. Some points related to language, culture, and a long history of the country have become involved in the FoN context. Next, I will provide an overview of Mahidol University, and the impact that may occur regarding the university's policies and strategic direction. In addition, external influences and the internal situation that may influence the direction and strategic planning of the Faculty will also be explained. The external influences are classified into four categories: National Education System, Ministry of Public Health, Nursing Education, and Mahidol University. The internal situation covers the present situation of the Faculty together with the issue of Information Technology (IT) and its problems. All these issues will lead to an understanding of why this study has been conducted.

2. General Information about Thailand

Thailand is located in Southeast Asia with a total population of approximately 63 million, of which approximately 6 million live in Bangkok – the capital city (National Statistical Office Thailand, 2002).

The country has 'Thai' as an official language, while English has been adopted as a second language. Since the country has gradually been transforming itself from an agricultural to an industrial country, the ability to communicate internationally in English is vital and is now becoming an essential requirement when applying for a job. However, this has been a concern for the government. Although the National Education System has considered this, gaps in the ability of schools to provide English instruction, particularly between the schools in rural and urban areas, still exist.

In the early days, Thailand was an absolute monarchy ruled by a succession of kings, but was transformed into a constitutional monarchy in 1932. In general, Thai people had perceived the kings as semi-divine, and paid them respect and strong admiration. The revolution of the national education system in the country occurred because of the initiation from King Rama IV (or King Mongkut, 1851-1868), and other developments continued thereafter in the same direction. These developments included establishing the first medical school in the country in 1890, which was later merged with other schools and became the University of Medical Sciences in 1943 and was subsequently renamed to be Mahidol University in 1969. An overview of the university and internal development will be explained later in the following section.

The first nursing school of the country was also founded in 1896, a few years after the first medical school, with modern medical concepts and a new healthcare system. This school is the origin of the Faculty of Nursing at Mahidol University.

Since this study is focusing on Nursing Education in Thailand by using the Faculty of Nursing at Mahidol University in Thailand as a case study, I will firstly give an overview of organisations relating to Mahidol University and the Faculty of Nursing (Siriraj) before illustrating about the Faculty in detail.

It should be noted here that both the medical school and nursing school were established in the same area, close to Siriraj Hospital. This area has been expanding and now serves as a major campus of Mahidol University. Despite the Faculty of Nursing at Siriraj Campus, the University has another nursing school serve as a department under the Faculty of Medicine, Ramathibodi Hospital, which is based at Payathai Campus. The term 'Faculty of Nursing (Siriraj)' in this study may appear interchangeably with the term 'Faculty of Nursing' or 'FoN', both of which refer to the same organisation. The Faculty that I will refer to is the one based at Siriraj campus.

3. Faculty of Nursing at Mahidol University

3.1. Mahidol University

As stated briefly about the university, most of the Thai people know Mahidol University as the 'Medical University' in Thailand. The university comprises three main campuses, namely Siriraj, Payathai, and Salaya. The first two are in Bangkok, while Salaya is located in Nakornpathom –approximately 20 kilometres to the west of Bangkok.

In 1999, there were 19,360 students (11,856 undergraduate students, and 7,504 postgraduate students), together with 20,429 staff; of which 2,803 are academic staff, 4,182 are academic assistants and research staff, 4,315 are administrative personnel, and 9,129 are employees who work at three university hospitals (Mahidol University 2000). Currently, there are approximately 500 study programmes provided by the University (414 programmes in Thai, and 86 programmes in English) ranging from the certificate level to the bachelor degree, graduate diploma, master degree, on up until doctorate level and postgraduate medical training programmes (Mahidol University 2000).

According to the Eighth National Higher Education Development Plan, in terms of accessibility and equity of education, Mahidol plans to establish new campuses in many provinces, for instance Karnchanaburi in the western part, Nakornsawan in the northern part, and Umnartcharoen in the eastern part of Thailand. IT has been perceived as a tool to communicate among campuses and possibly as a tool to facilitate teaching and learning in the near future.

Since 1997, Mahidol University has launched the project "Mahidol University Campus Network (MUC-Net)" with the intention to link every faculty and every institution across the university. The Computing Centre of the University, responsible for the MUC-Net project, had planned to increase speed and performance and expand the network to new campuses in the near future. This project had brought a significant change to the University. It was hoping to be a positive change, and, due

to the newness of the technologies, it was assumed it would bring something better to the entire university, which certainly included people in the Faculty of Nursing.

3.2. Faculty of Nursing (Siriraj): A Brief History

The Faculty was first established as a Midwifery and Nursing School in 1896; this was the origin of nursing education in Thailand. Due to the support of Prince Mahidol of Songkhla and the Rockefeller Foundation, American nursing experts were employed to develop a nursing curriculum in the school based on a modern teaching and learning pattern. This later became the first standard model of nurse education management in Thailand.

Having been recognised as the largest and oldest nursing institution in Thailand, the Faculty has continued producing high quality, professional nurses and has a reputation in terms of nursing education, research, and academic services. Regarding the nursing standard, the Faculty always considers this the highest priority. Indeed, it has been confirmed by the National Nursing Council of Thailand that the Faculty has one of the highest standards of nursing institutions in Thailand. Currently, the Faculty has eleven nursing academies as affiliated institutions under the responsibility of the Ministry of Defence, Ministry of Public Health, and the Bangkok Metropolitan Administration, which means that nursing students from the affiliated institutions have to pass a final examination produced by the Faculty before graduation.

The Faculty celebrated its 100th anniversary in 1996. In the light of social and technological change, 100 years of nursing education is full of development and change. Currently, the Faculty provides many courses ranging from bachelor to master to doctoral levels, together with nursing specialty-training programmes, and international training programmes. Internationally, in 1996, the Faculty was appointed to be the World Health Organization (WHO) representative Centre for nursing and midwifery development in Southeast Asia.

In 1999, there were 2,063 students enrolled at the Faculty, 1,785 in undergraduate level, 278 in postgraduate level (Mahidol University 2000), and approximately 200 full-time academic staff.

3.3. Organisational Structure

At present, the Faculty comprises seven departments; one Dean, Office of Administration; and three other units, see figure 3-1.

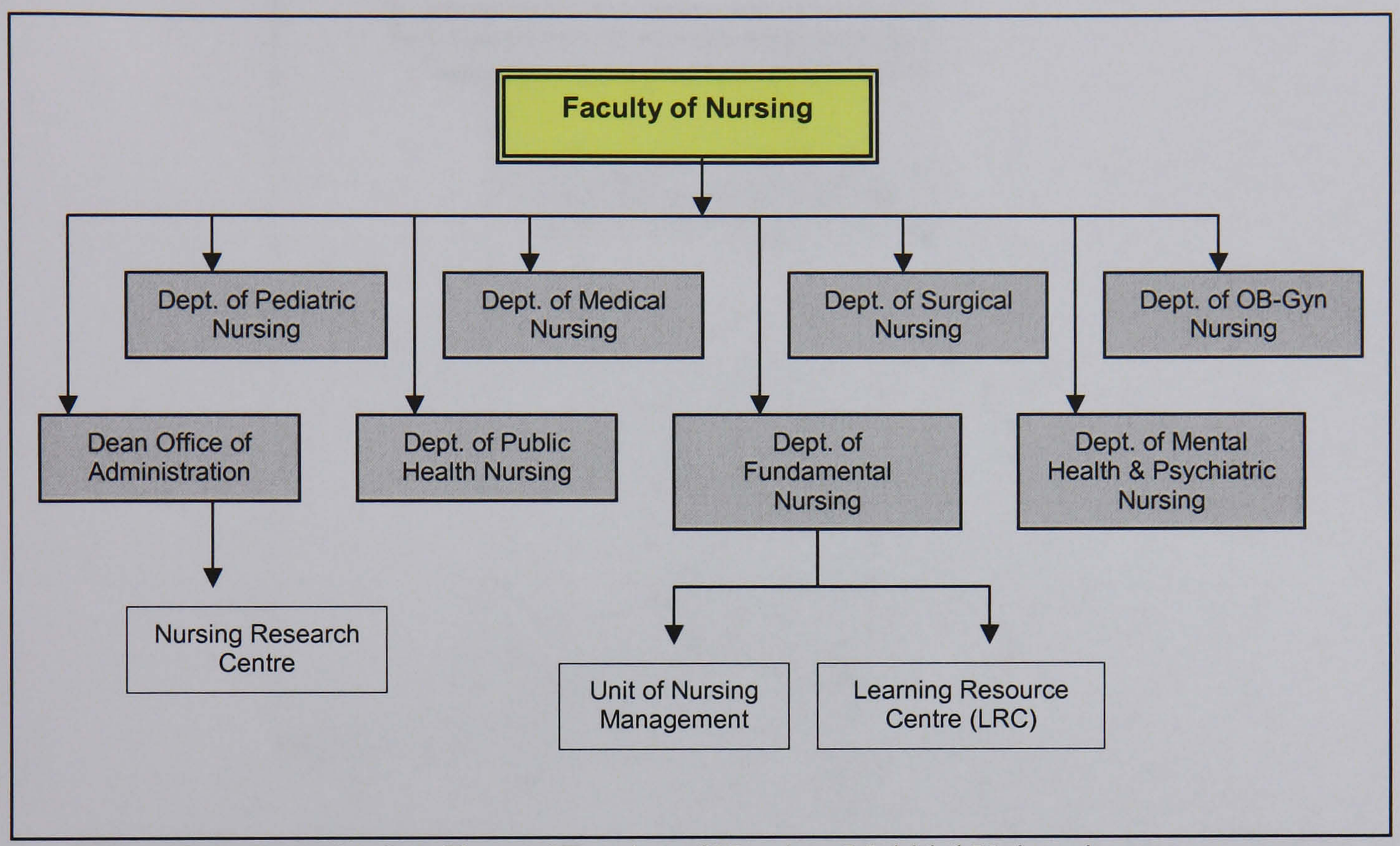


Figure 3-1: Organisation Chart of Faculty of Nursing, Mahidol University

The new three units formally established are:

- Learning Resource Centre (LRC)
- Nursing Research Center
- Unit of Nursing Management

The Computer Centre was established, initially, under the responsibility of the Learning Resource Centre (LRC), but subsequently has been shifted to the responsibility of the Dean Office of Administration and reports directly to the Dean of the Faculty. I will briefly describe the background of the LRC before explaining about the study programmes at the Faculty.

3.4. The Learning Resource Centre (LRC)

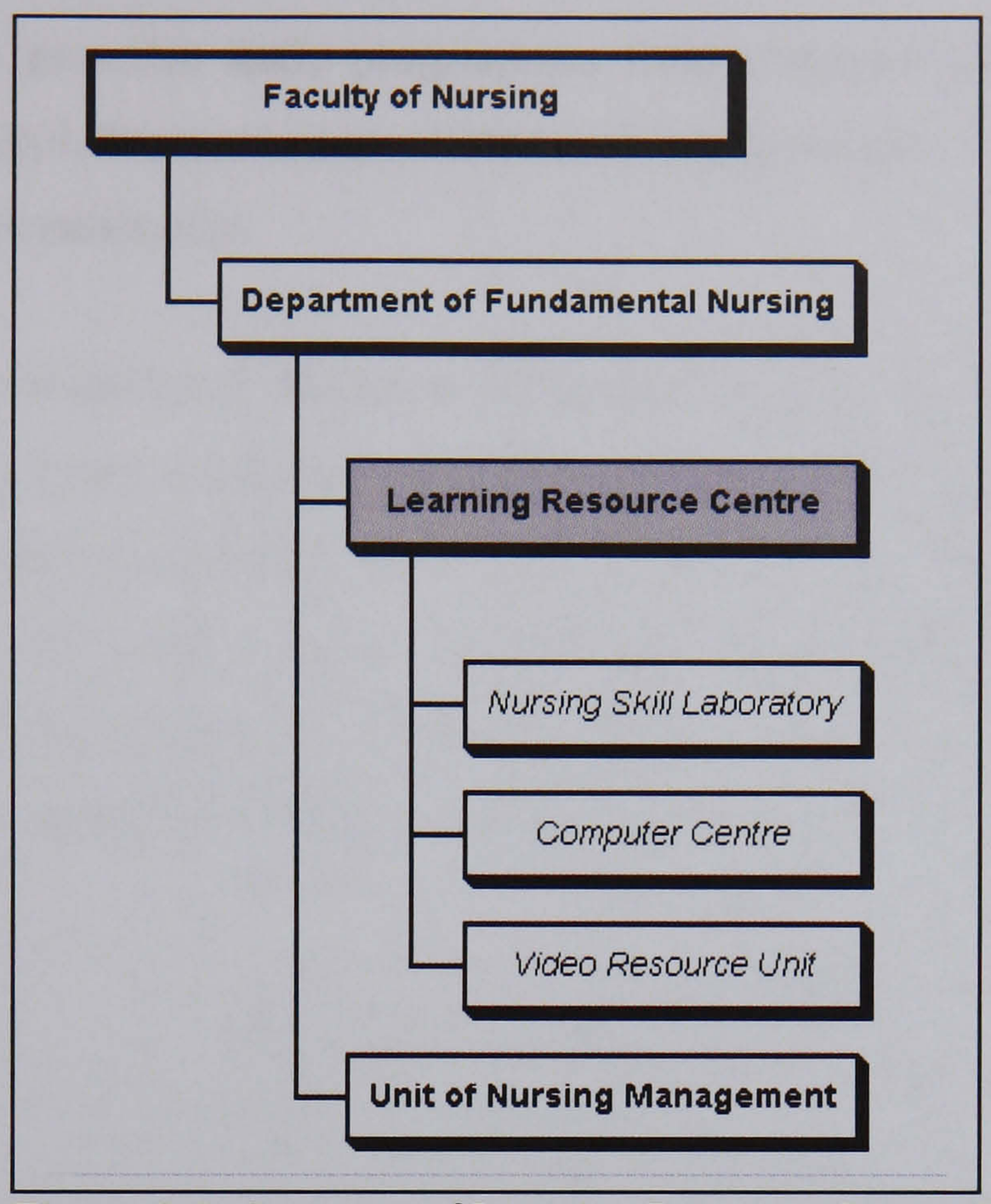


Figure 3-2: Structure of Learning Resource Centre (LRC)

The LRC was founded in 1988 with the goal of being a learning resource for nursing students to use to improve their practical skills. By simulating real world situations, nursing students are able to develop their practical skills when interacting with patients without intruding on them. Indeed, the nurses' level of confidence as well as their problem-solving skills have gradually been built up before confronting a real situation. This enables students to transfer nursing theory into practice, construct their knowledge, and bridge the gaps between these two.

The LRC was initially organised as a unit under the Dean Office of Administration before being transferred to the Department of Fundamental Nursing in 1992. At that stage, there were three units under the LRC: Nursing Skill Laboratory, Computer Centre, and Video Resource Unit, see Figure 3-2. This meant that the Computer Centre would be perceived as a sub-unit under the Department of Fundamental Nursing. However, in the last few years, the managerial structure has been reorganized, and the Computer Centre is no longer a responsibility of the LRC and is now a unit under the Dean Office of Administration.

3.5. Study Programmes

The Faculty provides study programmes from undergraduate level to postgraduate level. This includes nursing specialty-training programmes, which currently are being provided internationally.

The undergraduate level, Bachelor of Nursing Science (BNS), also covers a four-year regular programme and continuing education. The latter aims to improve a minimum standard of nursing education by providing practical nurses an opportunity to continue their studies in order to reach the bachelor degree level. The nursing education system in the Faculty, as shown in figure 3-3, depicts four types of the BNS programmes together with other study programmes provided in the Faculty.

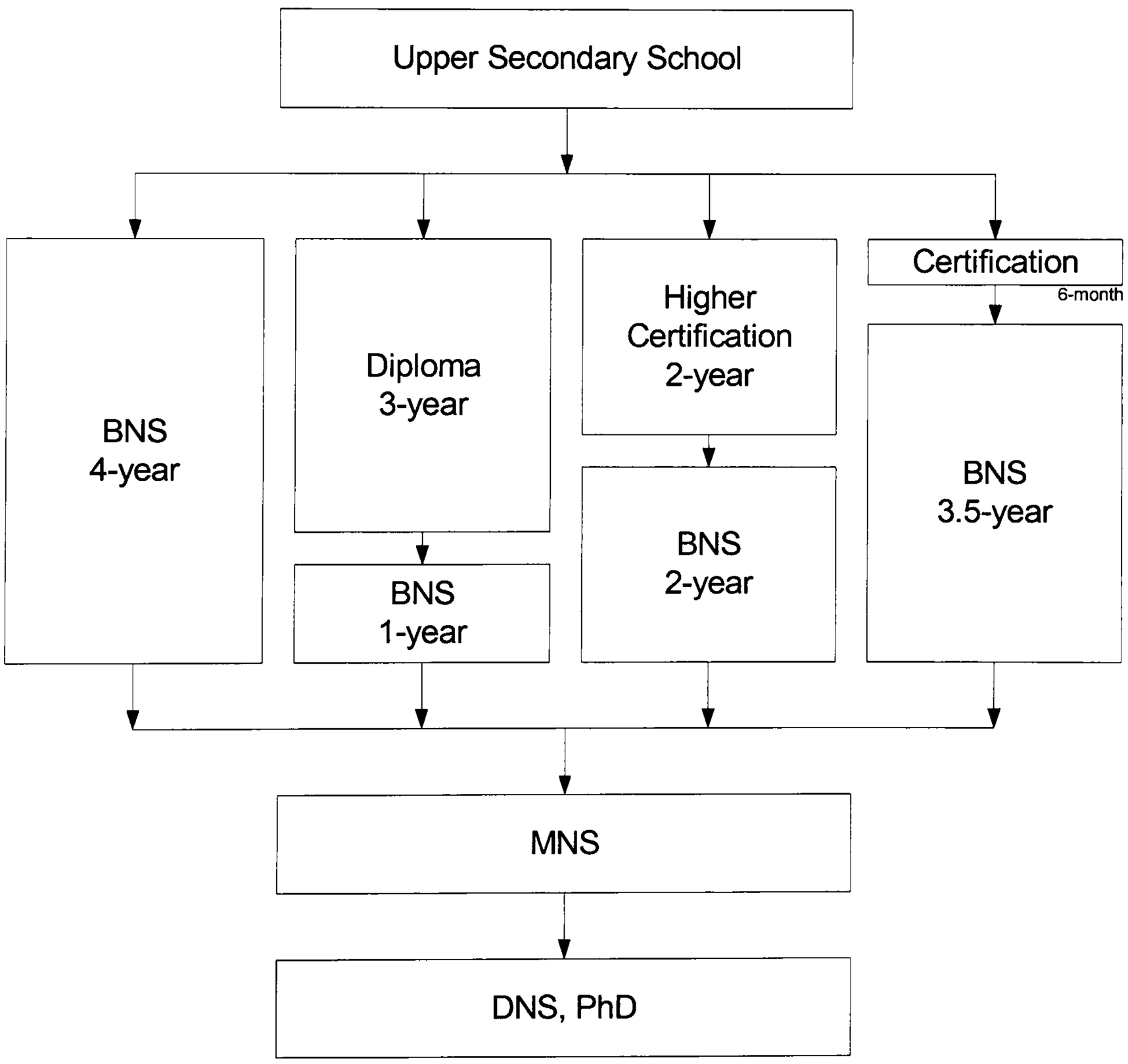


Figure 3-3: Overview of nursing education system at the Faculty of Nursing

Bachelor of Nursing Science (BNS)

As shown in Figure 3-3, there are four options to in order to earn the Bachelor of Nursing Science (BNS) degree. The BNS 4-year degree is a generic programme; students will be accepted into the programme through the national entrance examination. For the other three options, that is BNS 1-year, BNS 2-year, and BNS 3 1/2-year programmes, the Faculty has developed special programmes for students who hold certificates or diploma qualifications so that they continue their studies and earn a BNS. Details of each programme are elaborated as follows:

A 4-year generic programme.

There are approximately 180-200 students enrolled to this programme each year. Because of the national shortage of professional nurses, the Faculty has been requested by the Ministry of Public Health to double the number of nurses graduating; therefore, since 1997, the number of enrolled students was expected to be approximately 360-400 students.

A special programme leading to the B.N.S.

- 1-year programme: develops the competency of registered nurses who hold a diploma in nursing (a 3-year programme post 12th grade). There are approximately 70 registered nurses enrolled in this programme each year.

- 2-year programme: leads to the Bachelor of Nursing Science, established in 1987. The 2-year programme mission is to assist technical nurses (a 2-year technical nursing programme post 12th grade) who have been in nursing practice at least two years to upgrade their credentials. The programme has about 50 students enrolled each year.

- 3 1/2-year programme: enrols practical nurses who have only a 6-month training certificate and who have served in nursing practice for years to continue the study. The need for continuing education of practical nurses has been addressed in Thailand, as a result, the Faculty of Nursing has established a special, 3 1/2-year programme so that with another 3 1/2 years of study,

students can be awarded a BNS degree. This programme has approximately 30 students enrolled each year.

Postgraduate Programmes

The Faculty also provides Master and Doctorate programmes in Nursing Science including nursing specialty programmes. The specialty programmes are short-course training that aims to expand knowledge and expertise in a specialty area of nursing. At present, the Faculty provides nine programmes in a variety of specialty areas.

4. External Influences

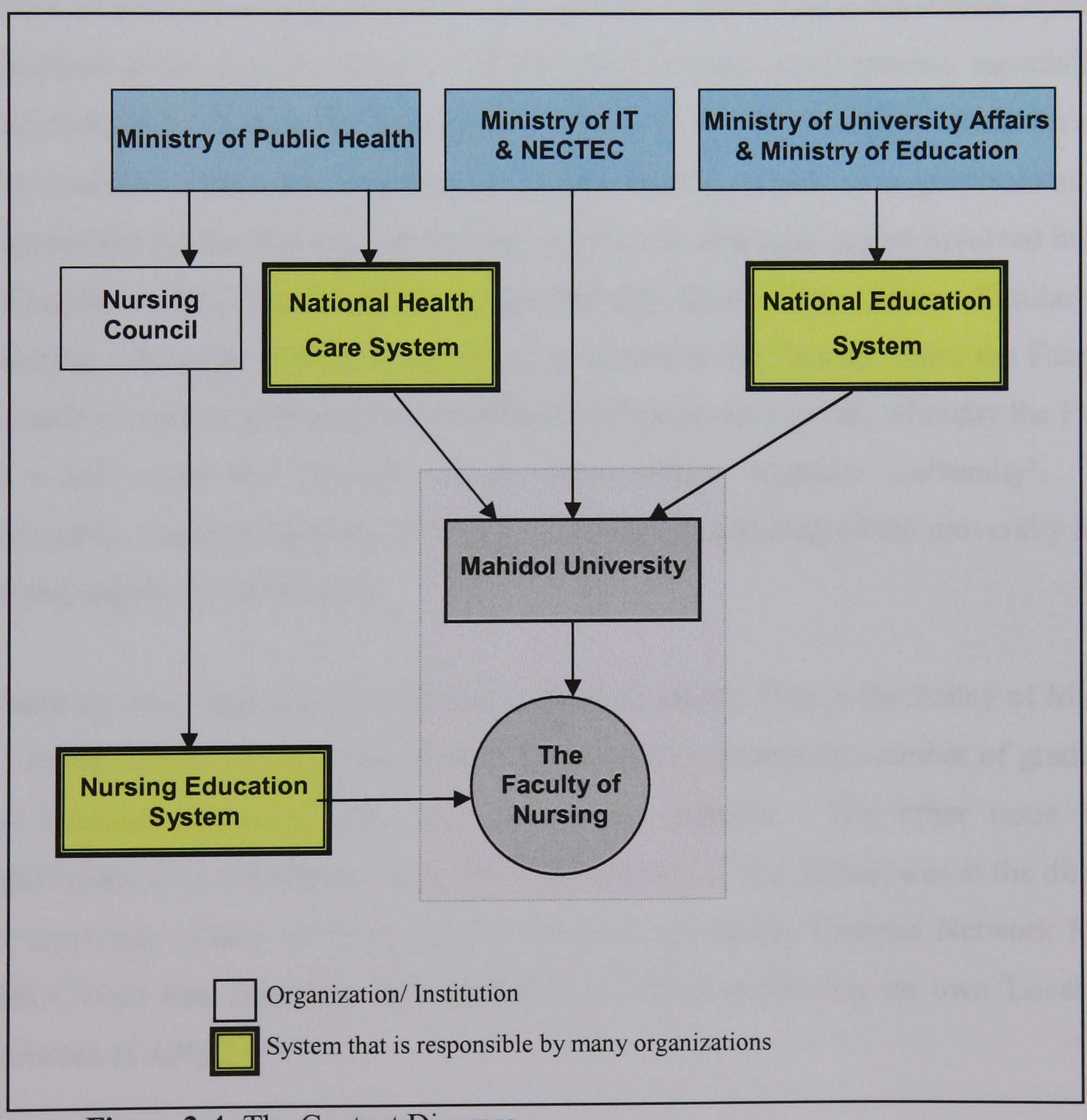


Figure 3-4: The Context Diagram

In order to keep the Faculty abreast of social, economic, and technological changes, as well as serving social demands, it is crucial for the Faculty to approach strategic

planning properly. The question is how to make it 'proper' and what aspects should be covered. As technology increasingly plays an important role in our world, many people consider Information Technology (IT) to be a strategic tool to facilitate change in their organisations. I will illustrate later how IT has been introduced to the Faculty together with the existing situation. However, first, for better understanding, general circumstances will be clarified.

From my point of view, and as clearly identified above, the Faculty as an organisation cannot stay alone without interactions with others. Therefore, I categorise these circumstances by addressing four main relevant objects that affect the Faculty either implicitly or explicitly, see Figure 3-4. These four main objects can be defined in terms of systems or organisations. For instance, the National Education System of Thailand is involved in terms of Policy and Planning Development, especially the National Higher Education Development Plan that will affect higher education across the country. Next, the Ministry of Public Health, which is a government body responsible for the National Health Care System in Thailand, is also involved in terms of Health Policy, Health Education, and Primary Health Care system. Similarly, the Nursing Education System is significantly related to the Faculty, since the Faculty is an active member who stays at the frontline of its nursing group, whereby the Faculty is a unit under the direction of the organization, 'Mahidol University'. Thus, inevitably, the development, direction, and strategic planning of the university have a strong impact on the Faculty.

There are two major issues that should be emphasized: One is the Policy of Ministry of Public Health that has requested that the Faculty double the number of graduating professional nurses in order to serve public demand. The other issue is the establishment of a computer network in the Faculty. This, in fact, was at the direction of university policy, or to be precise, Mahidol University Campus Network Project (MUC-Net) that implicitly had forced the Faculty to develop its own Local Area Network (LAN).

4.1. The National Education System in Thailand

Early education in Thailand was limited to mainly the aristocracy and the clergy. It was necessary for princes to be literate so that they could administer their provinces

and communicate with the palace in the capital, while monks had to know how to read the religious texts from which they preached sermons to the laity. The remainder of society was either in service or engaged in farming, so it was assumed that they had little need for reading skills.

The turning point of modernization can obviously be seen in the reign of King Mongkut (1851-1865) together with the growth of western influences. Knowledge of English became a necessary tool for communication with foreigners, and an English teacher was first hired to teach royal children. This policy was pursued in the reign of King Chulalongkorn, King Mongkut's son. In 1871, the first school was opened in the palace for young princes to learn. Subsequently, the 'English school' in the palace was set up to prepare princes and court children for studying abroad. The Ministry of Education, formerly known as the Department of Education, was developed sixteen years later. It was a revolution of the education system of the country. This profound change established a philosophy of education for the nation and led it in a more systematic way. Education was extended to commoners' children, and many schools, including teacher training schools, were founded. More importantly, women's education was also started. Education, thereafter, was open to all without barriers of gender, social background, or physical conditions.

It should be noted here that although the national education system is covered from primary to higher education, my study focuses mainly on faculties and university levels. Thus, I will focus only on higher education, and details of other education levels will not be addressed in this study.

According to the National Education System, the term 'higher education' is divided into 3 levels: lower than the bachelor's degree, bachelor's degree, and postgraduate degree. The first one, lower than bachelor's degree, aims to develop learners' mid-level knowledge and vocational skills. The second one, the bachelor's degree, aims to develop learners' higher level of knowledge and skills in various disciplines, while the third one, the postgraduate degree, aims to develop learners' specialized knowledge and skills, to strive for academic progress and excellence, especially in studies, research, and development of knowledge and technology (National Statistical Office Thailand 2002, p.20).

The major organisations that take responsibility, directly or indirectly, of the development and implementation of education are the Ministry of Education, the Office of National Education Commission (ONEC), and the Ministry of University Affairs. These organisations are entrusted with planning, administering, and coordinating the national education. Higher Education is under the Ministry of University Affairs, which coordinates the operation of state universities and privately operated universities and colleges.

Since the first university, Chulalongkorn, was founded in 1917, government has planned to decentralize education from Bangkok to regional centres. Many universities have been established in provincial centres scattered throughout the country, with status equal to universities in Bangkok. These include Chiang Mai University in the north, Khon Kaen University in the northeast, and Prince of Songkhla University in the city of Pattani in the south. These universities offer study programmes in many subject disciplines, such as agriculture, archaeology, architecture, arts, business administration, education, economics, engineering, humanities, law, medicine and nursing, science, and statistics. By 1998, there were 66 institutions in Thailand; of which 24 are public universities, and 42 are private universities and colleges (Ministry of University Affairs-Thailand 1998).

In general, the official teaching language at universities is Thai; it was only recently that English has become even more important. Since English has been accepted as a language for international communication, international academies have been established and conduct their courses in English. These have proliferated in Bangkok, but only a few have opened in other provinces.

Interestingly, not all of the institutes at the higher education level come under the responsibility of the Ministry of University Affairs. The Police Nursing College, for example, is under the supervision of the Ministry of Interior, whereas The Royal Thai Army Nursing College is both academically and financially the responsibility of the Ministry of Defence.

Some of these academies, which have medical and nursing programmes, collaborate with Mahidol University, particularly with the Faculty of Medicine and Siriraj Hospital and the Faculty of Nursing, as affiliated institutions.

The National Education System is a frame that covers every educational level range from primary school to higher education. It has an impact directly on universities across the country, including Mahidol University, and the Faculty of Nursing, as part of Mahidol University, will unavoidable be influenced by the system as well. I will address only two major issues, both of which are strongly related to the Faculty: the national higher education development plan, and the national university entrance examination.

National Higher Education Development Plan

Thailand is currently confronting changes from a complex and rapidly changing world. Such changes are overwhelming for individuals and society to cope with and can cause imbalances in various aspects of our development. Many academic scholars point out that social reform is essential at this stage to strengthen all sectors of our society. Reform of the education system is one of the most important areas of social reform, since it is believed that:

> "Education is a very important process to enhance individual development which will contribute to the social and economic development of the country"
>
> (Office of the National Education Commission, 1999, p.7).

This will enable Thailand to move through the current crisis.

Based on the 'Seventh national education development plan (1992-1996)', the education system in Thailand was expected to provide equilibrium between development in the economic, social and cultural aspects. Issues related to facilitating linkages between urban and rural sectors were mentioned, and policies for the development of an educational information system were also introduced. The 'Eighth national development plan (1997-2001)' focused on preparing the Thai people to cope with a rapidly changing world in the 21st century. This plan strongly emphasised that

the education system should facilitate the country's development towards self-reliance and sustainability and should enhance global competitiveness (Office of the National Education Commission, 1999, p.6).

Since 1997, a new era of Thailand's national education has begun. The development of Thai education has started to move forward based on the provisions of the 1997 Constitution relating to education. The enactment of the first National Education Act, in August 1999, paved the way for reform of education in Thailand to meet the challenges of the next century.

According to the 'Eighth national higher education development plan (1997-2001)', the six main objectives of this plan are:

1. Quality and Excellence
2. Accessibility and Equity of Education
3. Efficiency and Accountability
4. Relevancy and Delivery
5. Internationalisation and Regionalisation
6. Privatisation and Corporatisation

Many issues relating to the objectives also involve strategic planning and directions of universities. At this stage, the issues of privatisation and quality assurance receive more attention from academics at Mahidol University and Faculty of Nursing.

National University Entrance Examination

This examination is used as a standard test for students who would like to continue their higher education in public universities. It is a highly competitive examination. Many tutorial programmes or optional sessions have been advertised and continue to grow across the country to respond to students' demand, and perhaps parents', to prepare students for the examination. Both students and parents experience intense anxiety before the results of the examination are announced. Even so, most students still challenge themselves in this examination. Findings from the report on 'Teaching personnel strategy in Thailand: a review and recommendations' reveals that one of the major problems found in the teaching and learning process in science is that "at the

secondary level, there is an over – emphasis on preparing students for the University Entrance Examination" (Ministry of University Affairs-Thailand 1998).

The entrance examination has been perceived as quite prestigious. It is not only students who will be proud if they can pass the examination, but also their families. Unfortunately, the public institutions cannot respond to all students' demands. Students who fail from this examination still have choices to continue their studies in higher education, by applying to private universities/colleges, or open universities. Although some private universities have a better reputation and serve more than public universities, the national university entrance examination is obviously in demand by students. The social values associated with this examination still exist. Public universities, particularly in Bangkok, are perceived as the highest priority for them.

Enrolling in the Bachelor of Nursing Science programme (BNS), a 4-year generic programme, requires that students pass the national university entrance examination. However, many nursing academies do not rely on the national entrance examination; they determine their own admission criteria and processes. Although a key message from the nursing education policy is to give equal opportunity to all students regardless of their background, that policy sometimes has appeared as ignorance in comparison to the effort and the ability of the other group. This, somehow, creates a sense of 'discrimination' in someway.

It is not my intention to resolve the argument on the differences between these two enrolment channels here, but rather to highlight some points regarding equality and opportunity in education, specifically nursing education; problems in terms of standard nursing education in Thailand and the impact of a policy when interacting with a stable stage of the society; and illustrating some reaction to change in terms of standard improvement nationally, and so on. These have been addressed, in part, as a need to employ technology and a need to lead or drive the Faculty to implement tele-learning, and thereafter e-learning, in the following stage of the study.

4.2. Ministry of Public Health

As stated previously, the Ministry of Public Health is responsible for the healthcare system in Thailand. The Faculty, as an academy that educates healthcare professions for the system, has taken the National Health Care Policy into consideration and tends to develop programmes that serve healthcare demand of the country in both quality and quantity.

In terms of quantity, recently the Faculty has been asked to collaborate with the National Health Policy to increase the number of professional nurses in the national health system. Since the Faculty is one of the largest nursing institutions in Thailand, it was expected that the Faculty should be able to double the number of students from 1998 onward. Some budget has been provided to support this, but unfortunately, it has excluded money for staff. A number of academic staff has not seen their compensation increased due to the effect of the national economic crisis in 1997. In general, academic staff in public universities are government officers. Limitation of the number of government officers is one of the strategies that the government uses at this time to control their budgets. It is obvious that academic staff workload has been increased. The budgets can help in terms of purchasing more equipment, but the Faculty still has to confront some physical problems, for example sufficient lecture rooms, dormitories, and practical workplaces to gain clinical experiences, not just in demonstration room.

In terms of quality, the Ministry aims to increase the minimum education requirement for healthcare practitioners to at least the bachelor degree level. Continuing education programmes, hence, have been provided for technical nurses, practical nurses, and nursing assistants, in order to continue their studies. The Faculty is one of the nursing academies that offers such programmes. Indeed, our continuing education programmes have been tailored to serve specific purposes, whereby professional standards have been taken into account.

4.3. Nursing Education System in Thailand

The Nursing Education System in Thailand has been developed for more than a hundred years. It is a part of nursing professional development that strives to produce

professional nurses to serve our society. At present, there are many nursing academies established all over the country. Again, not all of these academies come under responsibility of one Ministry. In fact, there are many Ministries responsible for these academies, namely the Ministry of Public Health, Ministry of University Affairs, Ministry of Interior, Ministry of Defence, as well as the Thai Red Cross, the Bangkok Metropolitan Administration, and the private sector. The important issues are 'quality' and 'standards'. Therefore, the Thailand Nursing Council is appointed to take responsibility for this matter, and develop a standard for measuring and monitoring nursing institutions. In short, the Council is responsible for standard approval of nursing institutions. This issue has been addressed according to the National Higher Education Development Plan that has been developed to increase Quality and Excellence of Education. Quality can occur under the guidelines of three main aspects: quality assurance, quality assessment, and quality control. The standard approval of nursing institutions by the Thailand Nursing Council is accepted to be a part of quality assurance in education. In addition, the Council is responsible for nursing licences across the country. Nurses who receive the licence have to pass the nursing curriculum and graduate from nursing institutions that have been approved by the Council. This is seen as a strategy to control quality.

5. Information Technology at Faculty of Nursing, Mahidol University

5.1. Beginning of IT

At the Faculty of Nursing, computers were firstly introduced as general office aides, such as using word processing programmes to replace the typewriter. Each computer worked as a standalone computer. At that time, computer networks or multi-user system development planning had not been formulated yet. A computer room, which was planned to be in the computer centre, had been arranged and a number of computers launched for teaching and learning purposes. Apparently, technological equipment was obsolete thereafter, but purchasing new computer hardware to replace the old could not be done at once due to the limitation of the budget and lack of IT staff to help in planning and maintaining the system. Progress of the Computer Centre declined and became static for a period. In 1990, the line of responsibility for

the Computer Centre was changed, and it was transferred to the Learning Resources Centre (LRC).

In comparison with the Nursing Skills Laboratory (see Figure 3.2), the Computer Centre seems to receive less attention. This is perhaps because the Nursing Skills Laboratory was compulsory to the nursing curriculum; it provided students a place to practice and demonstrate skills necessary for clinical nursing before moving into a practice setting with patients; whereas the Computer Centre was just new equipment to the nursing curriculum, and not in line with any processes of the Faculty before. On the other hand, it can be seen that academic staff are familiar with teaching nursing procedures more than with new technologies. At that time, there were 5-7 computers in the computer room, and one-third did not function properly. Maintenance was disrupted due to a discontinued line of production of required components. Only one lecturer had carried on her lesson in a Computer Assisted Learning (CAL) programme, which was in the form of drill-and-practice and purely text-based, and students were required to use a personal slide projector.

5.2. IT-Existing System

It came to a point that the Faculty could not disregard this demand anymore. IT is not just student demands. It has emerged as a national demand, and appeared in the last two National Higher Education Development Plans (Plan No.7 and No.8), and was stressed as a main objective in Plan No. 9.

Mahidol University responded to the National Plan by establishing the university network in 1997. This has had a strong impact on the Faculty respectively, and the Faculty was expected to follow in the same direction. Demands to have IT did not stop at the point when the Faculty had finished purchasing hardware purchasing, neither have the hardware been displayed as a kind of furniture in the Faculty. In fact, technology should be treated as a substance. Students should benefit from technology and are expected to have 'IT Literacy' after graduation according to the policy of the university. How can students obtain IT literacy, if academic staff act as 'gatekeepers', cannot adopt, accept, or integrate technology into their teaching?

Purchasing new computers had just begun to serve academic staff and students' demand, perhaps following the policy of the university and in order to pass the criteria of Nursing Standard Approvals of the Thailand Nursing Council. Whatever the reasons are, it appeared that a number of new personal computers (PC) were ordered for the Computer Centre at the Faculty, and the obsolete ones would be replaced. These PCs were delegated to academic staff in every department – two PCs and two printers for each individual department. Unfortunately, this could not serve the high demand, and has not yet achieved a one-to-one ratio (1 staff: 1 PC). Findings from the pilot questionnaire in February 1999 from twenty-one academic staff responses, indicate that demand to have computers was still strong among the academic staff of the Faculty, as were demands to have technical support and IT-training courses. Details regarding this questionnaire will be presented and discussed later in Chapter 5.

The consequence of the 'MUC-Net' project implicitly forces the Faculty to seek responsible persons to handle IT-related work. Because IT had just been introduced to the Faculty, the initial phase was obviously a development stage, focusing on preparing an IT infrastructure. A summary of IT-related work during that time appeared as follows:

- Designing a network system
- Opening a bid for purchasing new hardware
- Installing general hardware
- Providing technical support
- Providing electricity to ensure the infrastructure can support the upcoming network system
- Surveying and proposing a new telephone system to increase flexibility in internal and external communications
- Providing IT-training courses for academic staff and administrative officers
- Developing a 'Computers in Nursing' course for nursing students

- Developing new software applications to serve specific purposes, for instance, Human Resources Management System, Inventory Control System, Enrolment System, and Item-Bank System.
- Developing Computer Assisted Learning (CAL) Programmes

It can be seen that these IT-related jobs have involved mainly the foundation of the system. It also helps indicating that the Faculty was in an early stage of the IT development process, and had been in the stage to provide technical infrastructure as a backbone of the IT system of the Faculty. In addition, it illustrates that the scope of the responsibility of the IT-staff was not clearly defined.

It was hoped that after the network system was settled, these irrelevant jobs, such as providing technical support or purchasing new equipments would be reduced. Apparently, the demand for applications of information systems to facilitate daily work had gradually been addressed. However, it should be stressed that the mission of the organisation is to advance education and academic purposes. It will be another stage of the development of IT to be employed in teaching and learning. In the meantime, requirements in terms of maintaining the technical infrastructure and developing administrative systems to support the Faculty's operations have been increasing. This conflict has gradually become visible. It was a conflict in terms of demand from the administrative level that did not match the academic staff's expectation. Indeed, the IT-staff member who had been transferred to take responsibility for the unit was holding a position as academic staff and was expected to do an academic job. Here the conflict in terms of role/position was highlighted. It is clear that the Faculty had developed a new need, but unable to fit this into the organisational structure or bring it in line with the organisational processes that the Faculty already had.

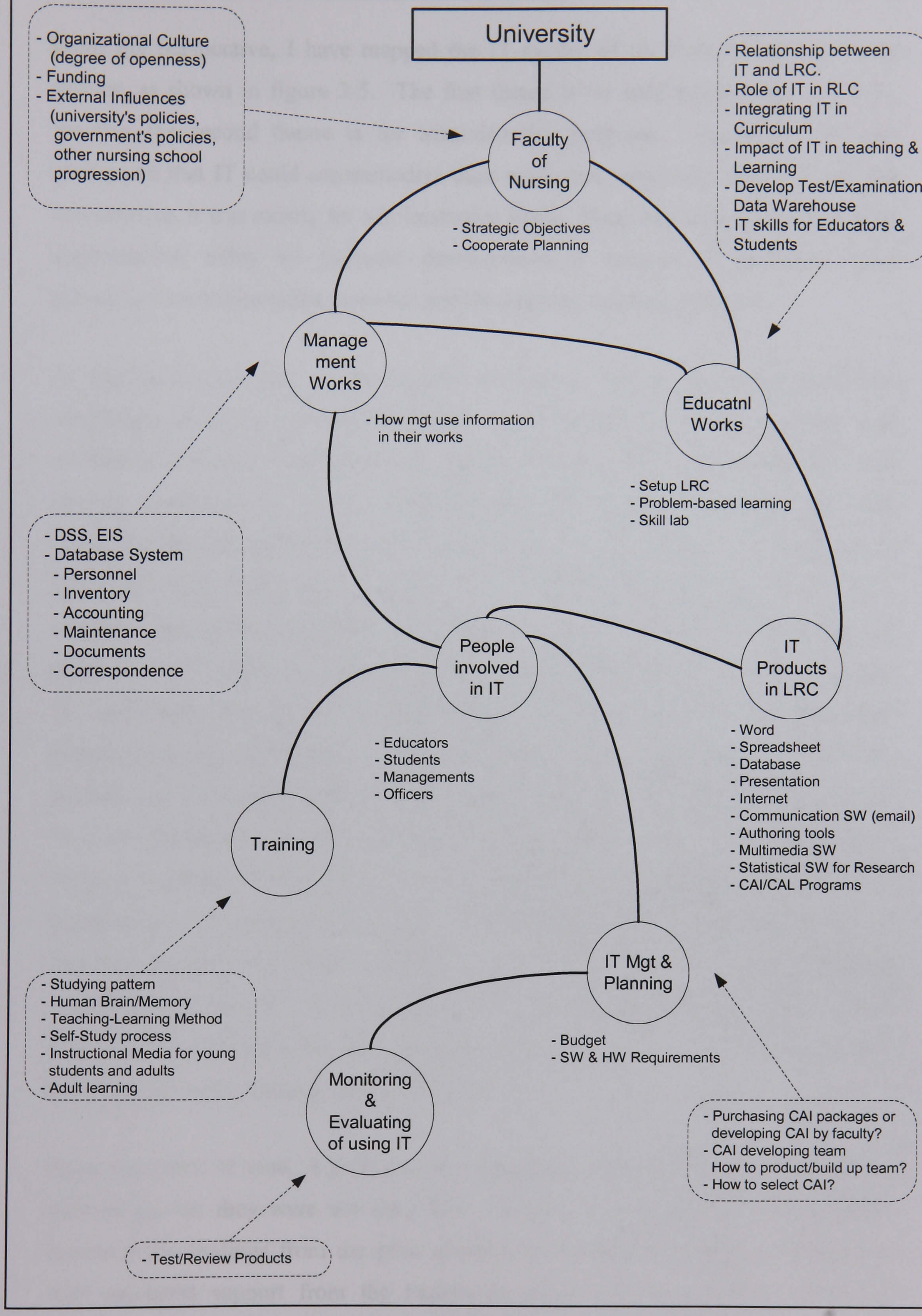


Figure 3-5: IT System of the Faculty of Nursing at Mahidol University

From my perspective, I have mapped the IT-system of the Faculty into two main themes, as shown in figure 3-5. The first theme is for teaching-learning purposes, whereas the second theme is for administrative purposes. Academic staff had anticipated that IT could accommodate their work, but apparently, when IT was put into practice, it was mostly for administrative work. Many applications that had been implemented, either by in-house development or commercial packages, were primarily for administrative purposes and not teaching-learning purposes.

At that time, computers at the Faculty of Nursing had not been integrated into classrooms or across the curriculum yet, even though a computer network was established and ready for them to use. Results from my pilot study in February 1999 through questionnaires for 21 academic staff, revealed that only two had used computers as teaching equipment. Fourteen out of twenty-one had computers at home, of which twelve had worked with word processors; one had just bought a computer, and another had bought one so her niece could play games. Only four of those who had computers at home used the Internet and email (see Table 5-1, Chapter 5). Although some academic staff intended to use computers to facilitate their presentations, it was simply transformed from just transparencies to colourful presentation with some animation on computers, but with the same teaching style. This also appeared in the way that students learn and how they have been assessed. Nothing had changed. Teachers were still playing an 'active' role in classrooms, while students were in a 'passive' role as usual. Even though the National Education Plan of Thailand intends to modify the concept of learning to become 'student-centred' and introduce the concept of 'lifelong learning' at every educational level, that is from primary school to higher education, teaching and learning at the Faculty of Nursing at Mahidol University seems to remain the same.

From my point of view, I perceived that academic staff would have liked to use technology, but they were not clear how. Evidence to support my interpretation comes in the findings from the pilot questionnaire, which illustrates that academic staff requested support from the Faculty in terms of increasing the number of computers, providing IT-training courses, and extending the service hours of the Computer Centre and technical support. It implies that academic staff is concerned about new technologies and would like to keep themselves up to date. In doing so,

they need more support from the Faculty, which can be through facilities, time, policies, motivation, or incentives. One may argue that this data has been collected from academic staff who attended IT-training courses, hence they implicitly have greater likelihood to use IT and may have a degree of concerns in using technology higher than others in general. For me, it is an initial stage that requires further exploration.

5.3. Problems, Limitations and Barriers

To summarise the IT-existing system, I would like to address five main problems from my point of view:

1) Network system of the Faculty in relation to MUC-Net

Performance of the networking system currently is not as reliable as clients expected. The network is very slow, and it takes much time to retrieve information on the Internet page by page. This makes clients upset and causes them to get bored. Their motivations to use information technologies have gradually declined. The network administrators, then, have attempted to alleviate this problem by setting up a Proxy and campus-gateway to block most of the multimedia applications from the Internet that require high resources, for instance, video and sound applications. Unfortunately, this limitation has turned out to be a barrier and prevented clients from learning more from the Internet.. Indeed, the network does not work regularly, and servers stop working frequently without prior notice. Managing the network is an important issue that has not been resolved yet, even at the Faculty of Nursing.

2) A preparation of the Faculty to exploit IT.

From the organisational structure, it is clear that an IT-unit had never been planned before. Since its establishment, the Unit has been relocated from one place to another from time to time. This has a strong impact on staff who work in the IT-unit. Not only have their job descriptions not been clearly defined, but their positions also are based on uncertainty.

From another perspective, it is difficult for the Faculty to plan for a rapid change of IT. Moving from standalone personal computers to network computers, IT has implicitly introduced change to the Faculty and has opened an opportunity to converge teaching and learning into new learning environments with new teaching and learning styles. However, changing technology does not imply that people will then be changed respectively, as demonstrated by the fact that members of the Faculty still employ standalone technology. Benefits of the network technologies that were implemented have not been exploited yet.

3) How the Faculty employ IT

The academic staff at the Faculty still use computers as a form of self-instruction. It has not yet changed to network learning or collaborative learning.

4) Perception of IT-committee to the technologies

The IT-committee perceives technology as a tool to facilitate teaching and learning as well as administrative work in the Faculty,. In this respect, IT has been treated as another separated stream that runs along others (a vertical perspective). In this case, it will be difficult for IT to diffuse across the Faculty (a horizontal perspective).

5) Lack of planning and monitoring of IT-work.

Evidence from implementing Email on the networking system and the developing Item-Bank Application Project reveals that the introduction of IT has proceeded without an appropriate plan. There are gaps between developing and delivering ideas into actions. It seems to me that their perceptions of the process of IT as an innovation are misleading. IT should be seen as a process, not an event.

6. Conclusion

This chapter has provided an overview of the Faculty of Nursing at Mahidol University in Thailand by starting from a brief history of the country, leading to the

context of the university and the Faculty thereafter. The overview of the institution together with its brief history will enable me to address social status, external influences, and potential impact on the present status and direction of the Faculty in the near future.

Technology has an impact all over the world, including Thailand. The National Education Development Plans of many countries, including Thailand, place more attention on investment of technological infrastructure as a fundamental communication channel of this decade. It has been perceived that new communication technologies such as the Internet and World Wide Web (WWW) will enable new approaches to and opportunities for teaching and learning. Thailand is currently in the stage of encouraging schools, colleges and universities to establish network connections among their groups. Meanwhile, opportunities to increase accessibility to education equally are expected to appear in rural areas, in particular. Having introduced computers to academic institutions, academic staff had gradually adopted this change by starting with general applications such as word processing. Soon afterwards, a new change followed, and computers were expected to be a tool to facilitate teaching and learning. Computer Assisted Learning (CAL) and many educational software flourished, and the computer was adopted in a form of self-instruction tool. Indeed, academic staff had been encouraged to develop CAL by themselves to serve their teaching. Although Mahidol University had announced a policy regarding developing CAL and considered it equal to conducting research project, only a few CAL projects were completed. Some of the difficulties that had been overlooked were that developing CAL was time consuming and required IT-skills to create appropriate multimedia objects and operate authoring tools. It appears that less attention had been paid to designing educational software; how software would be used; who would be their target groups; and especially the quality of the software. Perhaps the university was in the initial stage of introducing technology to academic staff, so encouraging them to produce CAL was more important than the quality of CAL. Possibly, quality would come after this stage.

As new communication technologies had affected the learning environment recently, styles of learning could be transformed. Computers that once were used for self-instruction and left as standalone computers have been changed to be networked

computers. This enables a new approach of learning, which most people call 'Collaborative Learning', or 'Networked Learning'. This approach can be used to enhance face-to-face classroom activities as well as to support entirely online course delivery, expanding access to quality education and interaction with peers, experts, and mentors. The benefit of this type of instruction that should be underlined here is an increasing of students' participation. Students can learn at anytime, any place, synchronously or asynchronously, and on-campus or off-campus. This collaboration has simply begun with introducing of email applications.

At this point, the Faculty of Nursing at Mahidol University had established a network, also intranet, and just started internal communication via email. However, it seems that technology remained separated from other courses and had not been integrated into the organisation or across curriculum yet. It was necessary for the Faculty to prepare for new campuses that would be established soon, whereby the Faculty needed to develop strategies to solve the existing problems that came to influence its direction. Findings from pilot interviews with the former administration of the Faculty helped me refine the problems of the Faculty more clearly. In fact, for the Faculty to achieve this goal and overcome these barriers, an appropriate plan required to enable them to step further into the 21st century smoothly, at the same time maintaining the frontline position in nursing education in Thailand and stepping prestigiously into the international level. Technology is perceived as a strategic weapon in a competitive information society and, perhaps, will be a solution for many problems, but approaches may not suffice to keep the Faculty abreast and remaining in the forefront. Rather it prolongs the Faculty in avoiding the change that waits ahead, and may not help them compete with others in a highly competitive environment.

Chapter 4: Innovation and Change: Theoretical Perspective

1. Definitions of Innovation and Change

Having discussed tele-learning and its elements in Chapter 2, we now come to the point of how we can implement tele-learning in the context of nursing education? The tele-learning implies innovation, or perhaps a kind of change, that I, as a change agent, will bring to the nursing institution. There are a number of studies in many subject areas that attempt to explain innovation and the change process. It is anticipated that once we understand its process clearly, we should be able to manage its adoption and continuation and become successful at the end. However, before we begin to explore its process, we should think about whether innovation has the same meaning as change?

Rogers (1995) highlights several authors who put the accent of innovation on newness; or any thought, behaviour or thing that is new because of the qualitative difference from existing forms (Barnett 1943); or as generation, acceptance, and implementation of new ideas, processes, products or services in an applied setting (Thompson 1967; Mohr 1969); or a change that involves not only a change in materials but also a complex of changes with regard to their use (Beal and Bohlen 1968). Some view innovation as early adoption of a new idea (Rogers 1995), others as being synonymous with creativity (Jacques and Ryan, 1978), or something akin to improvements (Havelock 1970), while some seem to see innovation as a change for the 'better', or something that is both new and beneficial (Havelock 1970). Niehoff (1966) elaborates that innovation is a process and begins with 'an idea on the part of a change agent and ends in its adoption or rejection by the potential recipients.'(p.40)

'Innovation' and 'change' appear to be interchangeable terms in many studies and other places (Marklund 1972). In education in particular, Havelock (1970) summarises a distinction between the two by explaining that change is a process that brings impermanence and can be either positive or negative, while innovation tends more to be solely positive. He also points out that the innovation process normally

begins with an invention state, but that an invention state is not necessary with 'change'.

Although we may understand the distinction between the two in some respect, in a management context it makes little difference as both encompass similar concepts in the aspect of managing innovation and change. Details in this regard will be elaborated in this chapter; however, in this thesis I shall use these two terms interchangeably, perhaps relying more on innovation.

To understand how to implement and manage change, we will begin by exploring innovation and the change process, which will help shape the way in which we try to manage it.

2. Innovation and Change as a Process

Most of the studies in innovation and change began with empirical evidence. Researchers believed that these phenomena had similarities. Although varying in details, the two would pass the same general stage, and somehow repeat themselves in some respect.

Early models of innovation and change saw them as a simple linear process or a linear sequence of functional activities. Lewin's three-step model (1952), for example, comprises unfreeze, move, and refreeze stages. It is an attempt to ensure a degree of permanence in the new change and overcome regression to the initial state after the drive for change has receded.

Lewin's model is philosophically based. It can be seen as either a linear or circular process and has influenced a number of studies., such as Clarke (1994), and Morrison (1998). Clarke opens up Lewin's concept, the unfreeze stage, by suggesting several activities that organisations can commence in order to destabilise the situation and thus increase the rate of the unfreezing process, that is by identifying major forces of resistance by using attitude surveys; enabling dissatisfactions in the organisation to happen explicitly and steer them further by using a forum, for example; and making use of external consultants and change agents in the process.

The second stage of Lewin's model is to take further action after needs have been identified. This stage needs careful support and creation of 'safe circumstances'. The third stage, refreezing, is to restabilise the organisation in a new stage, which requires careful attention to ensure that it will not revert to the previous stage. Strategies to nurture this stage are important, particularly when integrating a new culture or new practice into the organisational context (Morrison 1998).

The study of innovation and the change process has gradually emerged into wider area, including communication, technology, and education. Havelock (1970), in education for instance, points out that innovation can be seen differently depending on our perspective:

> "There are two ways to look at stages of innovation. One way is to see it from the point of view of the people who are being changed, and the other is to see it from the point of view of someone who is trying to change someone else." (p.4)

Havelock names the former 'the Client System', and the latter 'the Change Agent Perspective'. These systems could possibly be perceived as 'bottom-up' and 'top-down' perspectives or 'micro-macro level' perspective. As stated, it depends on how we locate ourselves when looking at innovation.

Fullan (1991), an educational scholar who was involved in educational change, proposed a process of change in his classic book 'The New Meaning of Educational Change' by classifying the process into four broad phases, as shown in Figure 4-1. The first three, initiation, implementation, and continuation, appear as a fundamental process. The fourth phase is added 'to make the process more complete' (Fullan 1991).

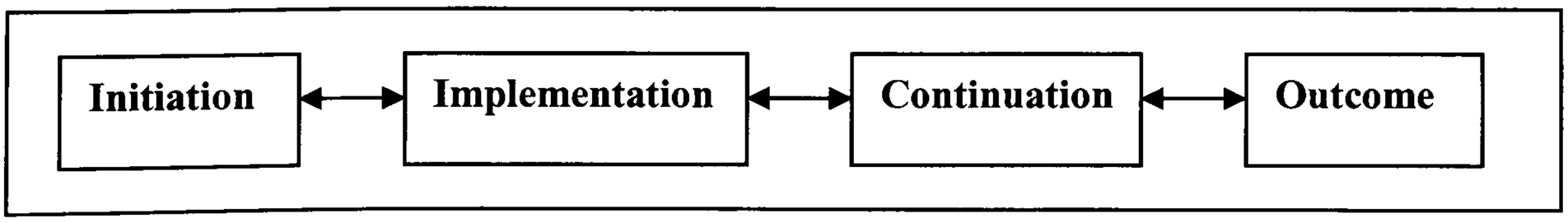


Figure 4-1: A simplified overview of the change process (Fullan 1991)

- **Phase I**: Initiation, sometimes labelled *mobilization* or *adoption*, consists of the process that leads up to adoption of change. Fullan, also, includes the decision to adopt change within this phase.
- **Phase II**: Implementation is the process of putting innovation into practice, and it definitely takes time, possibly 2-3 years.
- **Phase III**: Continuation refers to the process leading to the stage at which an innovation may become a built-in or accepted part of the system. Other terms, such as *institutionalisation*, *sustainability,* or *routinisation* give a similar meaning.

Fullan (1991) adds the fourth phase, *Outcome*, in the process to 'provide a more complete overview of the process'. He explains that when change is initiated, the direction of change will also be defined. Change may take years of planning and the preparation of a pre-implementation plan before deciding to put it into practice. After making the decision, change will move into an implementation phase, which means the new programme or idea has been installed or attempted to be used. Continuation is an extension of the implementation phase sustained beyond the first year or two in order to consider whether change can be implemented or not. Outcomes are varied depending on the objectives and can refer to different types of results; however, they can be both intended and unintended. The model in figure 4-1 also shows two-way arrows between phases, which imply that each phase can feed back to the decision made at previous stages. Fullan (1982) and Hall & Loucks (1975) remark that 'change is the process, not an event'.

It is obvious that Fullan's model of the change process is a linear model, though it has included feedback actions in between. In this regard, objectives should be identified clearly from the initiation phase. What will happen if those have been changed or modified after shifting to the implementation phase, and which results should relate with which? Indeed, questions might arise regarding why we have to wait until the end of the process to see the outcomes, since the monitoring process should be running along with interval evaluations when change is implemented. Either the change or the system has to be redesigned or restructured to facilitate change to the continuation phase. In this sense, it seems unclear what the outcomes mean.

It is interesting to note that although Fullan states that 'change is not a linear process', his diagram does display in linear. Indeed, nothing can indicate whether change moves to the continuation phase yet. In short, Fullan defines the implementation phase as a duration during which change has been installed. Continuation is somehow like a monitoring phase, and decisions can be reconsidered whether to further adoption or rejection.

Tidd, J. and Bessant, J. (1997) point out the limitations of a linear model approach and state that in practice innovation is a coupling and matching process that requires interaction between the two. Interaction indeed is the critical element.

Studies regarding this process from other subject disciplines, such as technology, communication, and management define these slightly differently. A summary of models involved in innovation and change from related subject areas, including education, is shown in Table 4-1.

Table 4-1: A summary of models relating to innovation and change in communication, technology, education, and management, sorted by publication year.

Subject Disciplines	Publication Year	Theorist(s)	Theory Name
Sociology	1943	Barnett, H.G.	Innovation and Cultural Change
	1952	Lewin	Force Field Analysis, Three-stage model of change
	1968	Guba, E.G.	Model of Change for Instructional Development
	1976	Bennis, W.G.	Planning of Change
Communication/ Technology	1962, 1995	Rogers, Everett.	Diffusion of Innovation, Decision-Making Process
	1987	Kwon & Zmud	IS Model
Education/ Sociology/ Psychology	1964	Mile, M.B.	Educational Innovation
	1968	Guba, E.G.	Model of Change for Instructional Development
	1970	Havelock, R.G.	Innovation in Education
	1971	Schon, D.A.	Central-Periphery Model
	1979	Hall	CBAM Model, Level of Use (LoU)
	1982	Fullan, M.	Meaning of Educational Change
Management	1971	Schon, D.A.	Central-Periphery Model
	1971	Gross, N.	Innovation in Organization
	1973	Zaltman G. & Duncan	Innovation in Organization

Subject Disciplines	Publication Year	Theorist(s)	Theory Name
	1998	Morrison, K.	Model of Change
	1994	Clarke, L.	Model of Change, Formula-approach
	1995	Carnell	Model of Change, Formula-approach
	1998	Smale	Innovation Triangles, Change Management Spiral

In the following section, some of the models appearing in Table 4-1 will be discussed in details. I categorise them into two approaches: system and individual approaches. Theories relating to these models will also be explained. However, it should be noted here that as I perceive myself as a change agent in this study, the system approach will be my main focus.

3. The System Approach to Innovation and Change

Rogers (1995), coming from a media, communication, and technology background, defines innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption". His model 'Diffusion of innovation' illustrates the process of innovation and how innovation has been adopted at the individual and institutional level.

3.1. Diffusion of Innovation

Innovation in this model implies a technological innovation. Technology in this context is defined as something that aims to reduce uncertainty in a cause-effect relationship, and innovation is something perceived as new by individuals or a unit of adoption. Although the purpose of technology is to reduce uncertainty, it also creates another uncertainty because of its newness. The model is illustrated in terms of communication flow. The term 'diffusion' consists of four main elements: innovation, communication channels, time, and social system. Although information flow is used to explain this phenomenon, other issues related to the success or failure of implementing innovations are also mentioned, such as appropriate communication methods for an appropriate time; the innovativeness of individuals; types of adopters and rate of adoption; a social system that includes social structure, norms, roles of change agents, and influences of opinion leadership; and a decision to adopt or reject

innovations by using the process of decision-making. As mentioned previously, innovation is associated with newness, so innovation, in fact, originates with invention. It usually occurs from the recognition of a need or a problem, and develops through research and development, either basic or applied research, then becomes a commercialised product. The innovation will pass through the diffusion process and will be adopted by users, and ends with its consequences, the last phase of this process. Rogers (1995) names this process the 'Innovation development process', as illustrated in Figure 4-2.

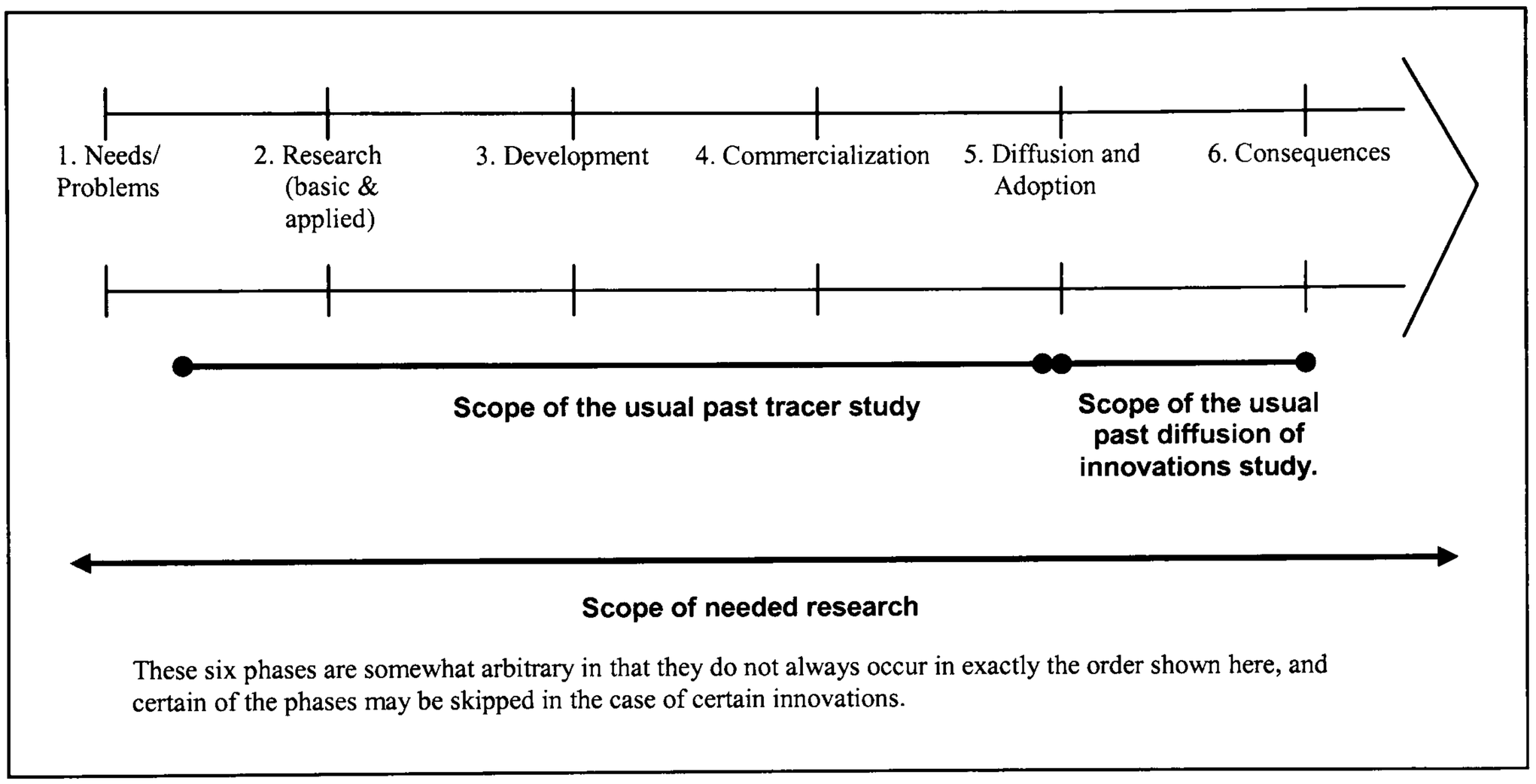


Figure 4-2: Six main phases in the Innovation-Development Process, showing the limited scope of past tracer studies and of past diffusion studies. (Rogers 1995)

The figure 4-2 illustrates clearly how diffusion or adoption phase, 5th phase, relates to the Innovation Development Process. Rogers, E.M. (1995) uses 'Innovation-development process' as a model to reveal its nature and intends to indicate that many studies in the past looked at the innovation only partially. The scope of studies, in fact, should be expanded to cover the innovation development process as a whole.

Once developed, innovation will be introduced to institutions or organisations by change agents. *A change agent* is an individual who attempts to influence clients' innovation-decisions in a desired direction (Rogers 1995). Although the change agents normally seek to obtain the adoption of new ideas, they may attempt to slow

down diffusion and prevent the adoption of undesirable innovations. However, communication problems may occur between change agents and their clients, which will affect the innovation while it is in the process. Rogers summarises success factors of change agents that it are positively related to:

1. The extent of change agent effort in contacting clients
2. A client orientation, rather than a change agency orientation
3. The degree to which the diffusion programme is compatible with clients' needs
4. The change agent's empathy with clients
5. His or her homophile with clients
6. Credibility in the client's eyes
7. The extent to which he or she works through opinion leaders
8. Increasing clients' ability to evaluate innovations

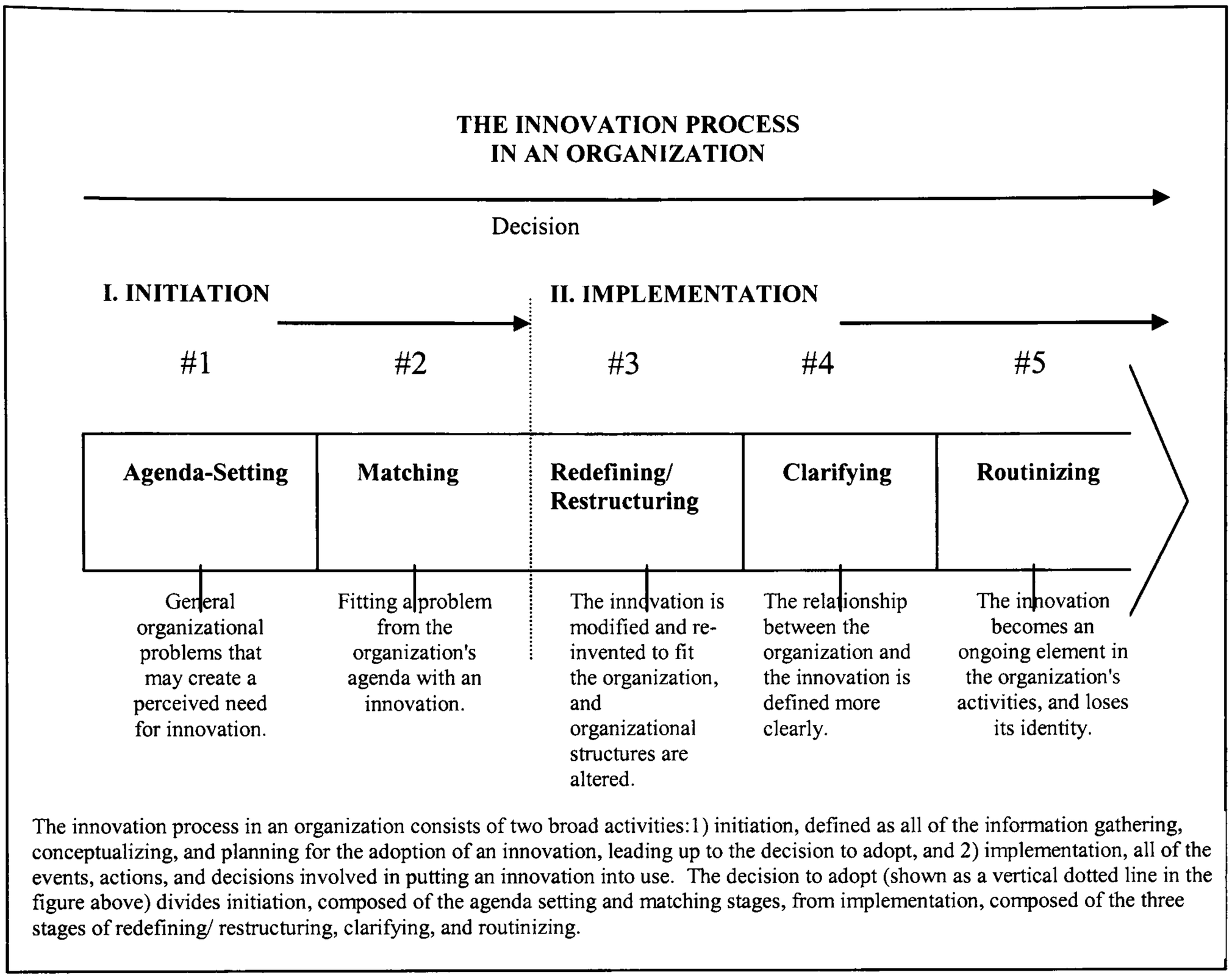
What Rogers tried to point out is that innovation interacts differently when put into organisations. That will make the innovation process more sophisticated than normal.

3.2. Innovation Process in Organisations

Rogers ascertains that innovations are not only concerned with individuals, but that many innovations are adopted by organisations. In many cases, individuals will not adopt any new idea unless the organisation decides to do so. Innovation process and organisation behaviours are merged to make the innovation process in organisations more complex than what we mention about the innovation process in general. This remarkable turning point was visible after Gerald Zaltman and Duncan (Zaltman, Duncan et al. 1973) published their book 'Innovations and organizations' (Rogers 1995). This book presents the distinctive aspects of innovation that take place in an organization; it suggests that the focus of the studies should be shifting from 'decision to use innovation' to 'putting an innovation into use in the organisation'. The book implies that an implementation phase is important and should not be overlooked. There is an incident showing that once the innovation was decided to be adopted, implementation did not always follow. Early studies of innovation in organisations focused mainly on correlating independent variables with organisational innovativeness. Later, a different kind of diffusion research in organisations began to

look at the innovation process within the organisation instead of determining the variables related to more-innovative and less-innovative organisations.

Rogers proposes that 'the innovation process in an organization' is in five stages, two in the initiation sub-process and three in the implementation sub-process, as shown in Figure 4-3. Additionally, later stages in the innovation process cannot be undertaken until earlier stages have been settled, either explicitly or implicitly. Initiation is defined as information gathering, conceptualising, and planning for the adoption of an innovation, leading up to the decision to adopt. Implementation is defined as events, actions, and decisions involved in putting an innovation into use. Shifting from an initiation to an implementation stage, an innovation will have to pass through a decision process. This is another important point that Rogers (1995) intends to highlight. In fact, the decision process does involve an adoption phase of an individual approach as well.



The innovation process in an organization consists of two broad activities:1) initiation, defined as all of the information gathering, conceptualizing, and planning for the adoption of an innovation, leading up to the decision to adopt, and 2) implementation, all of the events, actions, and decisions involved in putting an innovation into use. The decision to adopt (shown as a vertical dotted line in the figure above) divides initiation, composed of the agenda setting and matching stages, from implementation, composed of the three stages of redefining/ restructuring, clarifying, and routinizing.

Figure 4-3: Five Stages in the Innovation Process in an Organization
(Rogers, 1995, p.392)

Regarding the innovation process in an organisation model, A*genda-setting* appears in the first stage of the process. It is defined as the way in which needs and problems are identified and prioritised, which will lead to a search for a solution. In practice, needs have been identified later after innovation is implemented. This is because most organisations possess knowledge of only a few innovations that can offer solutions, so the chance of identifying an innovation to match the specific problem is small. Besides, from an information system design perspective, clients may not realise what they want until they get used to it. *Matching* is the stage that matches innovation with the identified needs and problems. If innovation cannot serve those purposes, it can be rejected before implementation. *Redefining* or *Restructuring* occurs when the innovation is re-invented to facilitate the organisation's needs and when the organisation's structure is modified to fit with the innovation. *Clarifying* occurs as the innovation is put into more widespread use in an organisation, so that the meaning of the new idea gradually becomes clearer to the organisation's members. At the same

time, misunderstandings or unwanted side effects of the innovation may occur at this stage. *Routinisation* occurs when the innovation has become incorporated into the regular activities of the organisation, and the innovation loses its separate identity.

3.3. Information System Implementation

Another view of innovation and the change process from an Information System (IS) implementation perspective comes from Kwon and Zmud (1987). They value a concept of an innovation process in organisations and propose a 'Six-Phase View of the IS Implementation Process' by combining an organisational innovation process with IS implementation model, as shown in Figure 4-4.

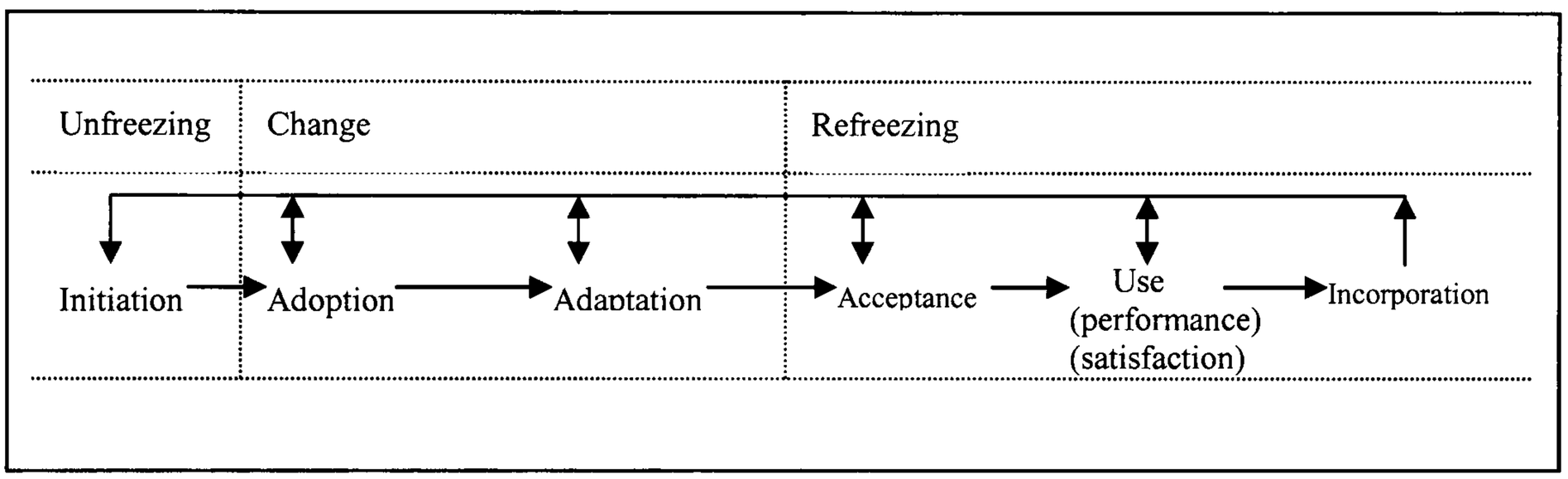


Figure 4-4: A Six-Phase View of the IS Implementation Process

The organisational innovation process in this case, is viewed as a three-stage process: initiation, adoption, and implementation (Thompson 1967; Pierce and Delbecq 1977). In the *initiation stage*, pressure to change can evolve from either need-pull or technology-push forces. The *adoption stage* involves a decision to develop resources necessary to accommodate the change effort. The *implementation stage* comes at the end and refers to development, installation, and maintenance activities. However, this organisational innovation model excludes a post-adoption or post-innovation evaluation process. Thus, four stages are added to the model, such as adaptation, acceptance, use-performance-satisfaction, and incorporation, and cause this then to be an Information System (IS) Implementation model. Feedback loops are also presented in the structure and may act in a positive or negative manner. Positive feedback would be expected to result in the full incorporation of an information technology, while negative feedback would be expected to result in a rejection of innovation or making it disappear.

This model seems to derive from Lewin's three-stage change model (1952), which included unfreezing, change, and refreezing, and explains as a linear model approach as shown in Fullan's change model (1982) though the feedback loops have been included. When comparing the Rogers' model to the IS Implementation Model, an initiation phase is divided into sub-phase named 'adoption phase'. An implementation phase is, however, similar in meaning '[to] put innovation into practice', but explained differently. It is clear that these models approach innovation from different perspectives. An IS Implementation Model focuses on an individual or micro-level, while Rogers' Model focuses on the system or macro-level. In the macro-level, it can be seen as an organisation or community level, and extended to cover population or social-network levels. It presents interactions between innovation and individuals in the system from initiation of the idea until routinisation or continuation of the idea. However, the places where the innovation originates, either internal or external, should be mentioned. If the innovation is generated internally, the adoption phase, as Kwon & Zmud present, will be a stage for the administration to make the decision to accept or reject it before moving to a further step. The administration will have another chance to reconsider and to make a decision when the innovation is ready to install. Users/clients will also be informed about the innovation along the development process, which should make their decision to adopt easier. In addition, it is also convenient for clients to participate in designing and developing innovation and tailoring it to serve their needs. On the contrary, if an innovation is generated externally, it is developed outside and will be introduced to the organisation by change agents. Users/clients will have less knowledge about the innovation when compared to the former case, and that will make it difficult to modify to serve the clients' needs, and the adoption rate may not be as high as in the former case. That is why Rogers proposes the Innovation Development Process Model to explain this matter and separate it from the Innovation Process in Organisation Model. In case of internal generated innovation, these two processes: Innovation Development and Innovation Process in Organisations, can run parallel to one another without waiting for the former process to finish.

The systemic approach as described has helped me revise an understanding of the change process, particularly when it interacts with an organisation. The social interaction within the organisation, in fact, has reshaped the innovation to serve user

requirements in specific contexts. Indeed, it explains to me how important it is to shift my location and change my perspective when looking at or approaching innovation in organisations. Now it is time to move from a macro- to a micro-perspective, and I shall explore how applicable the approach might be to the context of implementing tele-learning at the FoN.

4. The Individual Approach to Innovation and Change

If we interact with change, we cannot avoid people as Morrison (1998) states, 'change changes people but people change change.' Although, people respond to change in a variety of ways, Morrison (1998) points out that the art of successful management of change is to identify participants' perceptions, attitudes, values, beliefs, and opinions (p.15). An individual approach here is a model that derives from a micro-level, or individual level, and can probably be seen as a bottom-up perspective.

In this section, two models will be illustrated: The Concerns-Based Adoption Model (CBAM), and the Theory of Reasoned Action (TRA). These models focus mainly on people, for example assessing their relation to an adoption of the innovation; measuring their knowledge and skills regarding the innovation; understanding people's behaviours and making use of that knowledge to engage them in an adoption of this change.

4.1. The Concerns-Based Adoption Model (CBAM)

Hall, George et al. (Hall, George et al. 1979) suggest that people have different concerns during the innovation process. According to this matter, the Concerns-Based Adoption Model (CBAM) has been proposed to facilitate the management of change by identifying and addressing the concerns that people have at different stages of the innovation (Hall, Wallace et al. 1973; Hall, George et al. 1979).

Hall, Wallace, and Dossett from the Texas R&D Center first proposed this CBAM in 1973. It is a model of the complex process of change that aims to use diagnostic tools for assessing where individual members of an organisation are in relation to the adoption of an innovation. Hall proposes that the manager of a specified change could then use these diagnostic data in developing a prescription for needed

interventions to facilitate the change effort (Hall, George et al. 1979). The CBAM is a combination of two-dimension models, the Stages of Concern (SoC) and the Levels of Use (LoU) of the innovation. The primary dimension, the Stages of Concern (SoC) about the innovation, is based on Frances Fuller's research of teacher concerns in the 1960s. The secondary dimension of CBAM, Levels of Use (LoU) of the Innovation, focuses on the knowledge, skill, and behavioural aspects of the individual's involvement with a change. The combination of these two dimensions provides a powerful description of the dynamics of an individual involved in change, one dimension focusing on feelings while another on performance.

The Stages of Concern (SoC)

As a counselling psychologist, Frances Fuller (1969) conducts her studies on a series of group counselling sessions and longitudinal in-depth interviews of student teachers, and proposes a developmental conceptualization of the concerns of teachers. Although Hall comments that Fuller approaches her studies from a clinical rather than a pedagogical point of view, he still accepts that her clinical assessment provides a grounded basis for characterising the various kinds of concerns of pre-service and in-service teachers (Hall, George et al. 1979). Fuller proposes her model for personalised teacher education in 1970 and pursues her research into the dynamics of teachers' concerns (Fuller, Parsons, and Watkins, 1973) and arousal and resolution (Fuller and Manning, 1972; Fuller and Bown, 1975). Her pioneering work on the concerns of teachers serves as a basis for development of the Stages of Concern (SoC) about the innovation.

The SoC classifies concerns into seven different stages from earlier concerns to later concerns: Awareness, Informational, Personal, Management, Consequence, Collaboration, and Refocusing. A term 'concern' is defined as "the composite representation of the feelings, preoccupation, thought, and consideration given to a particular issue or task" or "the mental activity composed of questioning, analyzing, and re-analyzing, considering alternative actions and reactions, and anticipating consequences" or "…aroused state of personal feelings and thought about a demand as it is perceived." (Hall, George et al. 1979, p.5) The 'innovation' is also defined as "the generic name given to the issue, object, problem, or challenge, the thing that is

the focus of the concerns." (p.5). Hall addresses that each person perceives the importance of the demand of innovation differently at given times. Concerns will vary depending on the amount of one's knowledge about and experience with the innovation. However, it appears that, in general, a person's concerns about an innovation develop toward the later stages with time, successful experience, and the acquisition of new knowledge and skill. In addition, the development of higher-level concerns cannot simply be engineered by an outside agent; holding concerns and changing concerns is a dynamic of the individual.

The SoC has been used by a number of studies (Lewis and Watson 1997; Lewis, Watson et al. 1997; Manley and Brooks 1998) for diagnostic purposes and for personnel involved in the "adoption" of a process or product innovation. However, the SoC is not developed for purposes of screening or evaluation and is not designed to cover personality assessment.

Level of Use (LoU)

Based on a concept that innovation adoption is a process rather than a decision-point that has been expected after announcement of decision-makers, the Level of Use (LoU) is a measurement that attempts to assess what the individual innovation user actually does in using an innovation (Hall, Loucks et al. 1975). The concept of the LoU of innovation is to describe various behaviours of the innovation users through various stages, from spending most efforts in orienting to managing and integrating use of the innovation. The LoU is classified into eight levels, and each level has seven categories. These categories represent key functions that users carry out when they are using an innovation. Category descriptions in each level represent typical behaviours of users that are engaged in the process.

It should be noted here that the LoU is targeted toward describing behaviours of innovation users and does not focus on attitudinal, motivational, or other affective aspects of the user. The dimension does not attempt to explain causality. Instead, the LoU dimension is an attempt to define various operational states of innovation user behaviour, such as what the user is doing. The reason the innovation user does certain things is a reasonable question only after how the user behaves can be systematically described and measured.

4.2. Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) is pioneered by Icek Ajzen and Martin Fishbein in 1980 (Ajzen and Fishbein 1980). It is a model of the psychological processes concerned with beliefs, attitudes, social influence, intention, and behaviours. The aim of this theory is to predict and understand an individual's behaviour, and ultimately to influence or change behaviour (Ajzen and Fishbein 1980). The theory describes how people consider the implications of their actions before they decide to engage or not engage in a given behaviour. The theory confirms that the intention to perform behaviour is determined by the individual's attitude toward the behaviour and subjective norm held by the individual. Intention is the best predictor of behaviour, and attitude and subjective norms are the two basic determinants that influence the intention.

In general, intention is a function of two basic determinants, one individual in nature, and the other reflecting social influence. The personal factor is the individual's positive or negative evaluation of performing the behaviour, which is termed 'attitude toward the behaviour'. It refers to the person's judgement that performing the behaviour is good or bad, in favour of or against performing the behaviour. The latter one is the person's perception of the social pressures put on him/her to perform or not perform the behaviour. It is termed 'subjective norm'. Both attitudes and subjective norms are functions of beliefs, but beliefs of a different kind. The beliefs that underlie a person's attitude toward the behaviour are termed *behavioural beliefs*, while beliefs underlying a person's subjective norms are termed *normative beliefs*.

The theory is based on the assumption that most actions of social relevance are under volitional control. However, under circumstances where internal and external factors might hinder the volitional control of the behaviour, the Theory of Reasoned Action is a relatively poor predictor of these types of behaviours. Thus, the Theory of Planned Behaviour, which is an extension of the Theory of Reasoned Action, was developed, incorporating behavioural control factors into predicting behaviour. It posits that most intended behaviours are subject to some uncertainty and that the success in performing behaviour depends not only on intention but also on factors that may interfere with behaviour control. For instance, external factors such as money,

opportunity, and the cooperation of others and internal factors such as skills and self-control may influence a behaviour (Netemyer, Burton et al. 1991).

The theory has been applied to many behavioural domains, for instance, donating blood, voting, attending church, planning a family, smoking, dental hygiene, having an abortion, purchasing various consumer products, attending employee training, using seatbelts, changing the behaviour of alcoholics, and AIDS research (Ajzen and Fishbein 1980; Eagly and Chaiken 1993).

What helps me from the Theory of Reasoned Action is to understand how to approach people individually and how to convince them to engage in an adoption of the innovation. Davis, F.D. (1989) applies the TRA and Theory of Planned Behaviour to his theory 'The Theory of Technology Acceptance Model (TAM)'. It extends to covering perceived usefulness and perceived ease of use, both of which can be related to some stages in IS Implementation Model. For me, concepts from these theories provide useful information for planning and monitoring individuals' acceptance of change. Moreover, they give me strong evidence to show that behaviour can be predicted, and, in particular, can be changed! Introducing innovation to organisations and developing implementation models of the innovation will also mention these issues. However, in-depth probing is beyond my framework of study.

5. Managing Change

The main purpose of understanding innovation and the change process is to help us understand how to handle and manage a complexity of innovation and change properly, particularly when the innovation has been put into an organisation context. In change management concepts, many approaches have been employed, and obviously, no model can fit all.

Morrison (1998), for instance, introduces his perspective on models of change in three broad categories: formula-driven approaches, problem-solving approaches, and staged approaches. His concept derives from Lewin's three-stage model, and it is clearly performed on a linear view basis. Smale (1998), however, proposes another different

concept to take us away from a linear approach, interlocking triangles called "The Innovation Triangles". We will see details of each approach in the following section.

5.1. Formula-Driven Approaches

The notion of these approaches is that effective change will occur when people have needs. Morrison illustrates the approaches by presenting Clarke's equation (Clarke 1994), which can be written as

$$C = (ABD) > X$$

C= change

X= the cost of the change.

A = dissatisfaction with the existing status

B = the desirability of the proposed change

D = the practicability of the proposed change

Carnall (1995) presents his formula as:

$$EC > Z$$

EC= the energy for the change

Z = the perceived cost of making the change.

And rewrites it as:

$$EC = ABD$$

EC = the energy for change

A = perceived or felt dissatisfaction with the present circumstances and situation.

B = the level of knowledge of the practical steps forward

D = the shared vision

Although somebody might argue against these approaches, Morrison (1998) points out that they are useful in identifying key features for successful change. In addition, the approaches give many suggestions to managers of change to consider, for instance, dissatisfaction with the existing status; the desirability of the proposed change; the practicability of the proposed change; the cost of the change; the energy for the change; the level of knowledge of the practical steps forward; the shared vision of the future' knowledge of the first practical steps to be taken' and pressures and arguments for change present in the context of the organisation.

It seems to me that these formulas try to measure performance and exclude people's feelings. Although some formulas mention measuring perceived dissatisfaction, it does not seem to cover how people accept and use such change. On another aspect, this approach can help in explaining the relationship among particular factors and identifying the status of change, and when change will occur – but not 'how'.

5.2. Problem-Solving Approaches

Problem-solving models encourage participation and assume that participants have abilities to identify, operationalise, and solve problems. Morrison (1998) summarises stages from many problem-solving approaches as they usually start with identifying a real problem, then moving to the stage of generating solutions, and follow by deciding to choose one solution, implementing the solution, and finally evaluating the problem that has been solved. Another suggestion from a business perspective, such as Total Quality Management, is Bank's (1992), which identifies six-steps of problem-solving as:

Stage One: Identifying the exact problem, this includes prioritising problems if more than one.

Stage Two: Identifying the causes of the problem.

Stage Three: Generating possible solutions to the problem.

Stage Four: Choosing the most appropriate solution and translating it into action plans.

Stage Five: Implementing the chosen solution.

Stage Six: Evaluating the outcomes to see the effectiveness of the solution. This stage is also covered in monitoring procedures and measuring results.

Bank (1992) recommends focusing on an early stage to make sure that a correct problem has been identified and causes of the problem have been fully explored before reaching conclusions at the end of stage two. He emphasizes the value of brainstorming particularly in stage two and three. Brainstorming, as he mentioned, is a skill that can be learnt and practised. Morrison (1998) concludes that "brainstorming is a valuable tool as a technique for generating ideas in the problem solution stages." Obviously, the problem-solving approaches are very useful and can

be applied as strategies to approach in the many stages along the process of innovation.

5.3. Staged Approaches

According to Morrison (1998), a fundamental concept of these approaches is that "innovations and changes can be planned in a more or less rational, linear view". He presents Bullock and Batten's four-phase model of change as: 1) an exploration phase; 2) a planning phase; 3) an action phase; and 4) an integration phase. However, Burnes (1996) argues that the model involves too much detailed planning. A more open-ended view of change should be added in the sense that many relevant issues can appear and emerge along the change process, such as internal politics and possible conflicts. Such situations can not be anticipated. As mentioned in Contingency Theory, there is no 'one best way' for effective change and management that can be used as a blueprint for all organisations (Carnall 1995; Burnes 1996). Contingencies in this case refer to a difference of organisations in their structures and circumstances, which will be situational specific. It implies that the reality of organisation is complex, especially when involving a social nature. Burnes (1996) raises 'human factors' as one of significant contingencies that most organisations face and elaborates more on the need for organisations to take this matter very seriously in that:

> 1) people are emotional, sentient rather than rational-economic beings;
> 2) organizations are social and dynamical systems rather than mechanistic;
> 3) formal structures in organizations are complemented strongly by informal networks, practices, procedures, and norms.
>
> (Burnes 1996)

Clarke (1994) points out that change in humans is premised on a culture of sharing, collaboration, and communication. He proposes a six-stage approach to change, which can be summarised as:

> 1) Research the internal and external markets to identify the need for and direction of change.
> 2) Anticipate resistance and obstacles to change.

3) Mobilize commitment to the proposed change.
4) Plan and communicate the plan for change.
5) Constantly reinforce the change.

He also proposes a complex model of the change process, a twelve-stage model (Morrison 1998) that takes into account human dimensions and 'processual factors', such as traditions, cultures, structure, and environments of organisations.

1) Identify and become sensitized to external pressures for change – the external environment.
2) Examine the organisation's capability for change and diagnose what needs to change and what the 'levers' of change might be.
3) Examine the person who moderates this model in terms of his/her own values, attitudes, assumptions, and leadership styles.
4) Examine the process of change – how to spread the experience of what is happening in the change.
5) Create and develop a culture for change, perhaps through the creation of an internal market for change.
6) Anticipate resistance; identify how this can be managed and how commitment can be mobilized.
7) Practise visionary leadership.
8) Unfreeze the existing situation; destabilize the status quo and the comfort of inertia.
9) Communicate continuously and ensure involvement.
10) Manage incremental change through careful attention to timing, time frame, and the management of transitions.
11) Implement it.
12) Support, sustain, and reinforce the change to ensure institutionalisation in the longer term.

Clarke's model, as Morrison comments, is:

> …much more sophisticated than others because it succeeds in catching the dynamic quality of change and in incorporating this within a planned approach to change that looks at the human dimension, the processual dimension, the management dimension, the organizational

> dimension- the culture of the organization- as well as the substance of the change itself. (p.30)

From my point of view, Clarke's Model emphasises the 'Initiation Phase' more than other phases in the innovation process. Compared to Lewin's three-stage model, Clarke focuses on preparation of the 'unfreezing' stage and convinces implementers to understand the existing situation clearly, either at organisational or individual levels, before starting to change. It seems to me that his model is more focused on planned change rather than on the change process. However, it is still very useful for my theoretical framework as it also looks at the innovation process at both the macro- and micro-level.

5.4. The Innovation Triangles

Smale (1998) proposes a new 'model of managing change through innovation' named 'The Innovation Triangles'. Interestingly, he illustrates that the change process is not linear, and proposes change in an interlocking triangles form. Triangles, in this case, represent a symbol of change. The interlocking triangles Smale addresses comprise four levels (Smale 1998), as seen in figure 4-5.

Level One: What changes – What stays the same.

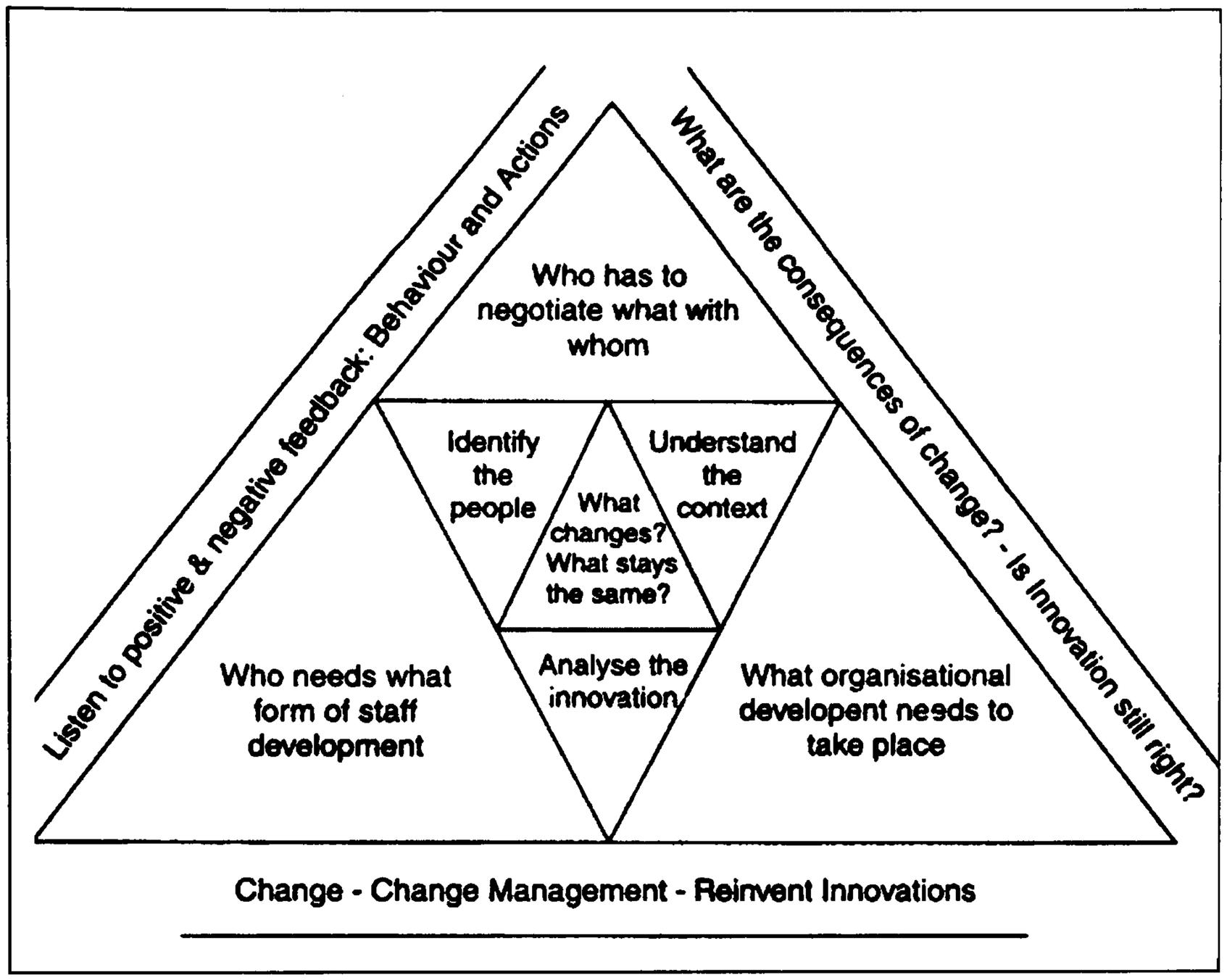


Figure 4-5: The Innovation Triangles. **Source:** Smale (1998)

It is the inner-most triangle of the model that looks fundamentally at identifying the changes to be introduced and the component innovations, considering the relationship between the proposed innovations and the problems they attempt to address.

Level Two: The Innovation Trinity

Smale stresses that this level is the core of the approach that looks at how change managers can plan change by focusing on three major issues:

1. Mapping people to identify all the key players.
2. Analysing the innovation to plan appropriate action and time-scale.
3. Understanding the context in order to use it to your advantage.

Level Three: Negotiations, Staff, and Organisational Development

This level will help the change manager identify the negotiations that need to take place and who needs what form of training, as well as what organisational

development should take place. It can be seen that this level is a policy perspective and strongly related to the analysis from the Innovation Trinity in level two.

Level Four: Feedback, Consequences, and Changing Change Management

This level is the outer border of the triangle. Smale encourages the change manager to understand his/her position and understand the social situation and the relationships between the key people involved. He points out that:

> The essential skills in managing change are about getting others to behave in an appropriate way: to get gatekeepers to give access to the resources they guard, to encourage product champions to put in the essential energy to carry through changes in all their complexity and so on. (p. 230)

The analysis of the Innovation Trinity can also be used to map the people and plan the actions required managing changes. However, as Smale notes 'no manager can control all the variables and the processes involved':

> Gardeners do not 'make' plants grow and sailors don't 'make' the wind that drives their boats. They both achieve what they do because they understand the natural forces and use them to achieve their ends. They may not reach their goals by doing all the right things, for the forces of nature are certainly greater than any power that they are able to exercise. So it is with policy makers, managers and practitioners of change. (p. 230)

However,

> "Failure to understand what is happening will at best hinder a successful voyage, at worst cause disaster." (p. 231)

Regarding the Innovation Triangles, Smale comments that each layer of the triangle represents a level of activity, but not a stage of development.

> The triangles summarise all the activities but perhaps give too neat and too mechanistic a picture of the processes. (p. 249)

He, then, transforms his model, the Innovation Triangles, into an alternative diagram (see figure 4-5) to illustrate how the action of each level causes the change manager to return to other levels of activity when he states that:

> These overlapping activities will be returned to, not as change agents 'go back to the beginning', but as they return to renegotiate the answers to basic questions as they spiral through time. (p. 320)

Smale's spiral diagram has ascertained that change is a process, and, in particular, it is not a linear process as appeared in the first generation model of the change process, see figure 4-1 as an example. It also indicates that the process can move round and round and not just one time of feedback loop. Each round could make the organisation move closer to an institutionalisation stage. This implies that the change process can be over. However, during the process, many changes could happen simultaneously.

6. Summary

After reviewing all the related innovation and change theories, I have classified these into two categories: system and individual levels. On another perspective, innovation process can be seen as either a 'top-down' or 'bottom-up' approach. Fullan's model of the change process is explicitly a phenomenological analysis (Hurst 1983) that relates to the individual or social groups and their behaviours. Roger's Diffusion of Innovation Model (Rogers 1995), explains the innovation process in terms of diffusionism analysis and analyses change in terms of communication or transmission processes. Havelock's Models (Research Development and Diffusion, Social Interaction, Problem-solving, and Linkage Model) are influenced by Rogers' Diffusion of Innovation (Rogers 1962; Hurst 1983). He employs a macro-level approach to help explain the innovation process, which involves people from different roles, such as initiators, communicators, and users. Although Havelock's Models are able to explain the innovation process in many aspects, I find Rogers' Models are

more applicable and provide a grounding of understanding in a macro-level approach in a wider context. Since the main purpose of this study is to develop an implementation model of tele-learning that is best suited for the specific nursing institution in Thailand, the tele-learning in this regard could be seen as an innovation. Therefore, models that could illustrate innovation in organisations seem to be applicable to this purpose. Rogers proposes 'innovation development process' to explain how innovation has been developed. Afterward, he illustrates 'innovation process in organisation'. The decision-making process, which is perceived as a significant indicator to move from initiation to implementation phase, has been clarified in another meaningful process. However, Rogers' view excludes individual-level or micro-level approach. An IS implementation model (Kwon and Zmud 1987) shows that the individual-level is crucial for successful implementation, and a 'bottom-up' perspective should be noticed. Two of the individual-level models, therefore, have been explained here, the Concern-Based Adoption Model (CBAM) and Theory of Reasoned-Action (TRA). These aim to point out individuals' perceptions and how they react to innovation and change.

In regard to my role as a change agent, it seems my position will be between the administration and faculty members. It is important to employ different communication approaches with these two groups since they have different needs and expectations from the innovation, and they are required to perform different actions according to their roles. The communication flow in this regard does not seem to be only up and down but also left and right. It appears that a system-only approach may not suffice to satisfy the requirements and organisation context. An individual-level approach should be considered in the theoretical framework. It should help expand the framework of the implementation model and be sufficient to explain findings from the study.

Having understood the process of change and innovation from technological and communication theories and a distinguished level of approach, I have expanded this exploration to cover some management theories to an aspect of managing change. Different approaches from managing change theories have been explored, such as the formula-driven approach, problem-solving approach, staged approach, and finally the Innovation Triangle. It appears that although there is some common ground in

explaining the change process, there are some different elements that should be considered to cover in the study framework. In particular, the Innovation Triangle has turned the concept of change from a linear to be a spiral process. This has provided me another view of innovation and change.

It is obvious that social and technological aspects should be included in the study framework of the implementation model. Indeed, dealing with change should not be only linear as change is seen as a process, not an event. Thus, understanding innovation and change, and organisational context, is essential and should be able to help in developing an appropriate implementation plan in an early stage. Merging the plan with the concept of managing change should provide the change manager an understanding how to handle change, as well as how to overcome any obstacles that may happen along the way. This has the potential to be successful in implementing innovation and change.

The next chapter will introduce you to the Faculty of Nursing at Mahidol University in Thailand. Some important background and related issues will be provided, and the points that led me to conduct this study will also be addressed.

Chapter 5: Research Methodology

1. The Methodology Unfolds

Information Technology (IT) at the Faculty of Nursing at Mahidol University (see Chapter 3), from my point of view, was divided into two main aspects: for administrative purposes and for teaching and learning purposes (see Figure 3-6, *IT System of the Faculty of Nursing at Mahidol University*). In practice, the former was the major focus rather than the latter. However, the IT-infrastructure was considered a fundamental part of both aspects. Network cabling was provided across the Faculty, and new computers and printers were gradually supplied. The IT-systems were established across the Faculty to specific tasks within the divisions such as Human Resources, Finance and Accounting, and Assets Management (Computer Centre 1999). However, there was very little in the area of teaching and learning.

Before the arrival of the computer network system, some academic staff used a standalone computer, green-screen with DOS-platform, in their teaching by combining text-based, in-house software with personal slide viewers to display questions and pictures. One or two of them had assigned students to use Computer Assisted Learning (CAL) software as a tutorial after classes. Unfortunately, the computers turned out to be old and obsolete. Some machines broke and could not be fixed; indeed, all spare parts were discontinued. It was difficult to maintain all of these. These academic members finally gave up using this method, and many related activities that relied on computers also stopped by then.

After the establishment of the computer-network system, interest in using IT was revived. The Faculty members, both academic and administrative staff, had new computers set up to accommodate their work with general office applications and Internet access and were now able to use applications such as Microsoft Office Suite, Internet Explorer, and Netscape Navigator, and so on. During this time, the Faculty had also been directed by policy from the Ministry of Public Health to increase the number of qualified, professional nurses to meet the demand of the National Health System. The number of student enrolments was expected to double but without

increasing the number of academic staff. There was an anticipation that IT would be able to help the staff cope with the associated increase in workload.

Since I came from a nursing and technological background, I followed technological trends and directions and kept asking myself how these technologies could be exploited for teaching and learning purposes at the Faculty. I discussed my ideas with one of my colleagues, Assistant. Professor Dr Yuwadee Watananon. She referred to terms such as 'tele-education', 'tele-learning', and 'tele-medicine'. These terms had been mentioned in daily conversation at the university, but from her point of view, nobody could clarify their real meanings. Although these were likely to be simply fashionable terms, they drove me to search further. Two main questions kept appearing in my mind. Firstly, 'What do we know about tele-learning, both in theory and practice?' And secondly, 'How can we introduce, manage, and implement this innovation in this particular Faculty?'

I began by exploring the meaning of tele-learning and related theories, and hoped that these would be able to provide me with a clear picture of what I should do further. It became obvious to me that an agreed definition of tele-learning was not yet in place. As I mentioned in the theoretical review of the tele-learning in Chapter 2, scholars tended to find their own ways to explore and experiment with it and defined the meaning from their own perspectives.

In accordance with the initial aim of this study, an understanding of the meaning of tele-learning only from a technological point of view seemed to be insufficient to cover other questions that focused on how to put the tele-learning into practice, for instance, to introduce innovation into organisations and to embed it into practice across an institution.

Therefore, to research the feasibility of introducing tele-learning, and subsequently e-learning, into nursing education in Thailand, I proposed my research questions to be:

1. What is an appropriate implementation model of e-learning for nursing education in Thailand?

2. What exemplars from the western countries could contribute to the development of the model?
3. How can literature in ICT, tele-learning, e-learning, and theories of innovation and change inform the development of this model?
4. Is the recommended e-learning model appropriate for on-campus or off-campus learning?

In the context of Mahidol University, since the issue of tele-learning is fairly new and there is little research to inform the study in Thailand, it will be necessary to conduct empirical work not only to inform the study in Thai universities but also elsewhere. The study design, therefore, needs to include:

1. Measuring the needs and existing perceptions of the value of tele-learning in Thailand.
2. Exploring the tele-learning in operation elsewhere, to elucidate its operation and to probe the implementation of an innovation.
3. Reviewing the innovation and change process and exploring its complexity in terms of how to manage it in an institutional context.
4. Probing in Thailand on barriers of analysis of stages one and two.

To have a comprehensive picture of the Faculty and to understand the existing system, it is better to start from general information. Although I understood the context of Mahidol University and the Faculty of Nursing (Siriraj), since I was on the academic staff there, this was insufficient to clarify the stage of IT at the Faculty and how the academic staff exploited it. There was no substantial evidence in terms of academic studies or any kind of Faculty reports to illustrate this matter since IT, including the networking system, was a very new issue for us.

In the meantime, as a part of my responsibility in leading the Faculty's Computer Centre, I intended to improve the Centre's services and IT-training courses for the academic staff and had prepared a questionnaire for investigating the staff's IT-skills across the Faculty. The questionnaire had been planned as a pilot study with a small group of academic staff who attended an IT-training course. Then, for my research, I

took the opportunity to add some questions about methods of teaching and the media used in their teaching.

After analysing the results of this questionnaire, many issues relating to policy and management arose. For instance, 'insufficient computers and printers, need technical support, and academic staff should, at least, be able to operate computers with some general applications'. Details and analysis of the results of this questionnaire will be illustrated later in this chapter. However, these results motivated me to explore what was underneath the policies and what administration's perceptions regarding IT in the Faculty were. To obtain this information, interviewing was the best choice for me in this circumstance. Two administrative members were interviewed. Details about these two interviews and the small-scale questionnaire will be given in the following section (5.1), which I call the preliminary phase.

It should be noted here that conducting this kind of research requires a qualitative methodology. Quantitative research methods would not be able to probe what is behind the policy in introducing tele-learning to universities and what has actually happened elsewhere. Therefore, a qualitative design has been chosen to be the major part of this research and results from each stage informing the design of the following stage (Guba 1985; Bryman 1988; Denzin and Lincoln 2000).

The study is designed in three phases: the preliminary phase, main phase, and final phase. The preliminary phase, conducted at the Faculty of Nursing, Mahidol University in Thailand, aimed at exploring the needs and perceptions of the administration in terms of policies, planning, and trend for how IT could be used at the Faculty, and also in how the academic staff employed IT in and out of their teaching. Results from the preliminary phase would inform subsequent steps for how the main phase would be conducted.

The main phase aims to look for cases where tele-learning had already been implemented. Experiences from people who have conducted tele-learning projects will be explored in terms of introducing change, the implementation process, and steps taken before and after implementation. Problems that happened along the implementation process will also be explored. Results from these cases will help me

develop a conceptual model of how tele-learning has been implemented in the context of the UK and the Netherlands.

In the final phase, I will revisit the Faculty of Nursing at Mahidol University. This phase aims to explore how the conceptual model from the main phase will be tailored to fit the context of Mahidol University. Both internal and external factors that may become influential in this matter will be investigated. Results from the final phase will reshape the model to suit the institutional circumstances and provide the answer to my research questions.

Because I come from a scientific background with very structured ideas about research, I assumed that the study design, plan for analysis, and every step in the study should be clear and planned properly from the beginning before proceeding with fieldwork. After the preliminary phase, I discovered that this understanding was not correct. The nature of inquiry for quantitative research in terms of testing a hypothesis and scientific studies differs from qualitative studies (Bryman 1988; Black 1999; Cohen, Manion et al. 2000). A systematic approach and structured design in the early stage is not appropriate in a qualitative study (Tesch 1990; Denzin and Lincoln 1994; Silverman 1997). I will explain this issue again after the preliminary phase section.

2. Preliminary Phase

After the University had changed the IT-system to the Distributed System and had begun the network installation project called MUC-Net in 1993 (Computer Centre 1999), it implicitly articulated that the university staff and students should develop their IT-skills. In 1997, the expansion of the networking system was able to connect every faculty and every campus together. The IT-Centre of the University, together with the IT-Centre of many faculties, then started to provide IT-training courses, from beginner to advanced courses, for their members. This also happened at the Faculty of Nursing (Siriraj) where faculty members had been prepared for this change. The IT-training courses, such as Introduction to computing; Introduction to MS-Word, MS-Excel, and MS-PowerPoint, had been provided more than 8 times in that year and

eventually, in 1999, became regular training courses all year round (Computer Centre 1999).

In the early years of the training courses, demand from the faculty members to attend the courses was very high and the resources were insufficient. Recently, the situation reversed. A number of staff enrolments to the courses have decreased and the number of those pre-booking, yet not attending the courses, has dramatically increased. As the faculty member who took responsibility for developing the Faculty IT-system, I had initiated the project to improve the computer services and IT-training courses for academic staff. IT-skills and service satisfaction were explored. A questionnaire was employed as a tool for collecting data from the academic staff across the Faculty. Before doing so, I piloted this questionnaire with a small number of staff. With this opportunity, another section in the questionnaire was added to explore how the staff used IT in the Faculty, together with teaching methods and teaching aids.

The questionnaire was piloted on 11^{t} February 1999, at the Faculty of Nursing, Mahidol University. It is worth noting that the questionnaire was written in Thai (see the translated version in English in Appendix A), but some of the data from open-ended questions will be translated into English for analysis and discussion in this study.

2.1. Pilot Questionnaire

Twenty-one academic staff at the Faculty of Nursing, Mahidol University in Thailand who attended an IT-training course, had been asked to complete the questionnaire before they left the training room. It means that the response rate was 100%.

The questionnaire comprised four parts: personal data, computer knowledge and skills, computer services, and teaching courses (see Appendix A). Many types of questions, such as dichotomous questions and rating scales (Oppenheim 1992; Cohen, Manion et al. 2000) were employed together with some open-ended questions.

All the respondents were academic staff, and all 21 were female. Their ages were between 26 and 52 years (X=43, N=21), and had teaching experiences from 2-26

years (X=15). In terms of their educational background, eighteen respondents held a Masters Degree (85.71%) and three of them held a Doctoral Degree (14.29%).

Most of the respondents (71.43%, n=15) had experience in using the computer, and 66.67% of the respondents (n=14) had computers at home. The purposes of using a computer at home are illustrated in Table 5.1.

Table 5-1: Purposes of using computer at home

Purposes of using computer at home	%
1. Word processing	39
2. Statistical analysis	23
3. Email and Internet	13
4. Playing games	13
5. Preparing teaching-learning materials	10
6. Other	03
	100

This reveals that computers are mainly employed for word processing. Some respondents accessed the Internet from home.

Recently the number of staff enrolled in the IT-training courses has decreased. The IT staff assumed that probably the academic staff that already had a high level of experience in IT and might not require the training courses. The IT-Centre, therefore, wanted to investigate in which applications those academic members were highly skilled, and which training courses that they required. Initially, my presumption was that if they were experienced in applications such as word processing, their need for training courses would be reduced. In addition, demands for the training courses would be explored. Results from the pilot questionnaire in this regard are illustrated in Table 5-2.

Table 5-2: Comparing users' experience in using general applications

Types of Application	Experienced			Need Training		
	Yes	No	No answer	Yes	No	No answer
Word processing	13	8	0	9	6	6
Spreadsheet	10	9	2	15	3	3
Presentation	9	9	3	13	3	5
Database	2	16	3	13	2	6
Statistics	10	9	2	15	1	5
Browsers	12	9	0	16	1	4
Bibliographic programme	0	18	3	13	3	5

As shown in Table 5-2, respondents mostly had experience in using word processing programs, spreadsheets, statistic programs, and browsers but had less experience in using bibliographic and database programs. When asked about the need for training courses, the highest demand focused on browsers, statistics, and spreadsheet programs. This indicates that the respondents were aware of Internet technology and wanted to know how to operate it properly. In accordance with the relationship between experience and training, it appeared that my initial assumption was applicable only to word processing but not to other applications. The results in Table 5-2 illustrate clearly that most of the respondents would like training in using browsers, statistics programs, and spreadsheets respectively even if they already had experience in using such applications. This implies that they wanted to increase their level of confidence and expected that training courses would be able to bridge gaps in their knowledge. However, there were some respondents who indicated that they had no experience in using an application but still did not need training; for instance, eight respondents had no experience in using word processing programs, and six indicated that they did not need word processing training, while six did not answer that question. Perhaps, they preferred to study by other methods, or perhaps they had no concern about using such applications. However, this needed further investigation.

In terms of general knowledge and IT-Skill, respondents had been asked to express the level of their confidence in using computers and the applications. As illustrated in Table 5-3, it is obvious that respondents were not at the same level of IT-skill.

As shown in the Table 5-3, at the first part of the skill assessment, 'General knowledge and skills in using computers,' responses were distributed mainly on the high and very high levels, and very low level. This result ascertained that there were some respondents who still had a low level of general competence in IT, whereby another group had already passed this stage and had high levels of confidence. This would be a strong reminder to IT-trainers and course designers to consider how to organise and design appropriate training courses. The data also illustrated that the respondents were likely to be confident in their general knowledge and skills in using computers and word processing programs when compared to the level of confidence in using presentation applications, computer network systems, and communication technology. This could be evidence to support the data in Table 5-2 that the respondents would like to know more about communication technology and how to operate the browser programs properly.

Table 5-3: General knowledge and skills in using computers applications (self assessment)

General knowledge and skills in using computers and applications	Level of confidence expressed						
	Very high (%)	High (%)	Moderate (%)	Low (%)	Very Low (%)	Total (%)	N
General knowledge and skills in using computers							
· Connect monitor and printer to computer	15.00	15.00	20.00	30.00	20.00	100.00	20
· Switch on and boot up system	33.33	23.81	19.05	4.76	19.05	100.00	21
· Understand how to handle disks safely to avoid damage	5.00	40.00	20.00	10.00	25.00	100.00	20
· Open and copy files	30.00	20.00	15.00	10.00	25.00	100.00	20
· Use mouse	30.00	25.00	30.00	0.00	15.00	100.00	20
· Use keyboard	15.00	25.00	25.00	10.00	25.00	100.00	20
Word processing programs							
· Create text/document file	20.00	25.00	15.00	5.00	35.00	100.00	20
· Delete and insert text	30.00	20.00	20.00	0.00	30.00	100.00	20
· Mark, copy, move, and delete blocks of text	25.00	25.00	15.00	5.00	30.00	100.00	20
· Search and replace text	10.00	35.00	20.00	0.00	35.00	100.00	20
· Print out document	20.00	35.00	5.00	5.00	35.00	100.00	20
· Load and save files to and from disk	30.00	25.00	5.00	5.00	35.00	100.00	20
· Use a spell checker	15.79	26.32	15.79	5.26	36.84	100.00	19
· Create and use a variety of text, paragraph, and heading styles	10.00	35.00	10.00	5.00	40.00	100.00	20
Presentation							
· Slide set up (size and layout)	5.26	36.84	10.53	5.26	42.11	100.00	19
· Use template	5.26	26.32	15.79	10.53	42.11	100.00	19
· Create presentation	5.26	15.79	26.32	10.53	42.11	100.00	19
· Print handout	0.00	21.05	26.32	10.53	42.11	100.00	19
Computer Network System and Communication Technology							
· Access to Internet	5.00	25.00	30.00	0.00	40.00	100.00	20
· Use email	10.00	30.00	20.00	0.00	40.00	100.00	20
· Search and retrieve data from websites	0.00	10.00	40.00	15.00	35.00	100.00	20

In the Computer Services Section, respondents were requested to state their satisfaction about services in the computer room and their expectations of the Faculty's computer system. Results revealed that eight respondents had never used services in the computer room. For the thirteen respondents who employed the services, they used the computer room for sending emails, searching, and analyzing data. Concerning the expectations of the Faculty's computer system, respondents expressed their ideas answering an open-ended question. Results have been classified, by data driven thematic analysis, into six main categories as illustrated in Table 5-4.

Table 5-4: Expectations on computer system.

List of the expectation on computer system	No. of response
1. Provide sufficient equipment: computers and printers a. Should have sufficient computer for every unit b. Should have computer for academic staff in every room c. Should have equipment for lecturers to prepare teaching material d. Should have sufficient printers	10 *8* *2*
2. Need technical support a. Should have IT-staff to provide support politely b. Should have staff to provide suggestions or support when technical problems occur. c. Should have staff to provide knowledge all the time, and should have lecturers to provide knowledge and give suggestions when faced with problems d. Should have staff who can provide sufficient system support e. Should have somebody who can provide suggestions when facing technical problems.	5
3. Provide sufficient service and modern a. Sufficient service b. Computer system should be modern c. Computer room service should be open all the time.	2
4. Academic staff should be able to use computers and be able to operate, at least, basic applications. a. Academic staff should be able to operate, at least, basic applications. b. Faculty members are able to use computers.	2
5. The Faculty should provide computer courses for the public.	1
6. The system should have a search engine for searching full text on Internet.	1

Respondents focused mainly on hardware, such as computers and printers, and technical support. This reflects that respondents had high concerns about insufficient equipment and technical support more than other issues, and this was beyond their control. It is directly associated with the policies and direction of the Faculty.

In terms of teaching, respondents were asked about their courses and methods of teaching, together with the teaching media that had been employed in their courses, see Table 5-5.

Table 5-5: Methods of teaching and media using in teaching courses

Method of Teaching and Media	Course Level						
	Bachelor (year)				Master	Doctorate	Specialty
	1	2	3	4			
Methods of Teaching							
• Lecture	4	6	6	5	4	0	2
• Seminar	1	1	1	2	2	0	1
• Problem-Based Learning	0	1	7	7	1	0	2
• Practice in Skill Laboratory	1	3	1	3	0	0	0
• Practice in Hospital	0	0	8	13	3	0	2
• Practice in Community	0	0	0	0	0	0	0
• Practice in Computer Room	0	0	0	0	1	0	0
• Other…*using models*……..							
Media							
• Handout	4	3	7	8	4	0	2
• Videotape	2	1	3	1	2	0	1
• Slide	2	4	5	1	2	0	2
• Computer Assisted Learning (CAL) Programs	0	0	1	0	0	0	0
• Internet	1	0	0	1	0	0	0
• Audio/ Cassette Tape	0	0	0	0	0	0	0
• Other …*transparency*	0	0	1	2	2	0	0
…*models*	0	0	1	0	0	0	1

Thus, three main teaching methods had been employed at the Faculty: lecture, Problem-Based Learning (PBL), and clinical practice in hospital. In particular, in the Bachelor programme in years 3 and 4, clinical practice and PBL seemed to be the major teaching methods. The lecture has retained its status as a popular teaching method at the Faculty for a long time. Recently, PBL has just been introduced to the Faculty and we used it in Years 3 and 4 of the Bachelor Programme for clinical teaching in particular.

Handouts, videotape, and slides were media that academic staff regularly used. One participant used a Computer-Assisted Learning (CAL) programme in her teaching course, and one respondent brought the Internet to her classroom. It became obvious that there were signs of interest that the academic staff would like to bring technology into their courses and to reap the benefits from it.

Concerning teaching aids that the respondents had employed in their teaching: findings from Table 5-6 revealed that most of the respondents (n=17, 80.95%) used transparencies and overhead projectors as their main teaching aid. Fourteen

respondents used a whiteboard (66.67%), thirteen respondents used slides (66.90%), eight respondents used a video player (38.10%), four respondents used computers (14.29%), and one participant used a visualizer (4.76%). None of them used a video camera or multimedia projector.

Table 5-5: Teaching aids that had been used in teaching courses

List of teaching aids	No. of Response	Percentage (%) N = 21
Transparency overhead projector	17	80.95
Whiteboard	14	66.67
Slide projector	13	61.90
Video player	8	38.10
Computer	3	14.29
Visual presentation (Visualizer)	1	4.76
Video camera	0	0.00
Multimedia Projector	0	0.00

Although the current data was insufficient to explain how respondents employed computers in their courses, whether inside or outside classrooms, this could be counted as a positive sign for technological acceptance and, perhaps, an indication of a shift to adoption.

Table 5-6: Perceptions of using computers in teaching (N= 21)

	Strongly agree (%)	Agree (%)	Moderate (%)	Disagree (%)	Strongly disagree (%)
Is a computer able to help you in teaching?	66.67 (n=14)	28.57 (n=6)	4.76 (n=1)	0.00 (n=0)	0.00 (n=0)
Is a computer able to increase the efficiency of your teaching?	76.19 (n=16)	14.29 (n=3)	0.00 (n=0)	4.76 (n=1)	4.76 (n=1)

The last two questions in the questionnaire aimed to explore the perceptions of the respondents in terms of using computers in teaching. Results from Table 5-7 illustrated that most of the respondents were likely to agree that computers were very helpful (66.67% strongly agree, and 28.57% agree) and that computers were able to increase the efficiency of their teaching (76.19% strongly agree, and 14.29% agree). However, two respondents (9.52%) held the opposite opinion (4.76% disagree, and 4.76% strongly disagree). Although this is a minor response, it needs to be investigated further. This may imply that some academic staff did not consider the computer as a fashionable thing, but rethought before accepting it. On the other hand,

it could also be inferred that they opposed technology and preferred not to change from their current teaching method. This would be another issue that needs further exploration.

2.2. Lessons from Pilot Questionnaire

After conducting the pilot questionnaire, I developed a clearer picture of how to use a questionnaire in research from beginning to end: from preparation to forming the questions, asking the questions, designing the layout, and administering the questionnaire, to analysing the data. Many questions needed to be refined, and the purposes of the questions needed to be clarified. How to ask the questions really mattered. The tone of the questions and the 'proper' language needed to be considered.

Collecting Background & Demographic Data:

Some variables, for instance marital status, number of children and their ages, had been included. It would be of interest to investigate whether these variables relate to how respondents employed technology. My assumption regarding these variables was that the respondents might be influenced by family members in terms of adopting technology. Some respondents did not answer this question; it may be that these questions were offensive to them. Black, T.R. (1999) suggests that in this situation the introduction of the questionnaire should state clearly why this information is needed, which could potentially enhance cooperation (p.201)

Clarity of the questions

In the second part of the questionnaire, regarding knowledge and IT-skills, I intended to investigate how people used computers at home and for what purposes.

1. Have you ever used a computer before? ☐ No ☐ Yes
2. Do you have a computer at your home?
   - ☐ No
   - ☐ Yes. Please specify the kind of work you do with computer(s)
     - ☐ For word processing
     - ☐ For data processing
     - ☐ For statistical data analysis
     - ☐ For sending email
     - ☐ Other .....
       .....

Figure 5-1: Clarity of the questions: duplicated meaning (1)

The check box 'for data processing' and 'for statistical data analysis' seemed to be duplicate choices, as these tended to illustrate the same purpose. Indeed, another question should be added here: 'who uses that computer(s)?' It would be better to let the respondents clarify this point rather than assume it myself.

Another point also happened in item number 10, the Computer Network. Two duplicate choices had been provided.

Computer Network System and Communication Technology					
• Access to Internet					
• Use email					
• Search and retrieve data from websites					

Figure 5-2: Clarity of the questions: duplicated meaning (2)

The term 'Access to Internet' should be clarified since accessing the Internet from the Faculty via the Local Area Network had different procedures than accessing the Internet via a modem from home. In terms of 'Use email', it could be either from email programs or from web-mail on the Internet. To prevent misinterpretation, some elaboration is required here.

"What did they do while getting online?" This was the question that came to me after receiving the responses. However, to obtain answers to this question some other open-ended questions should be included. Categories could be generated from these

responses and used as categories for subsequent closed response-modes (Oppenheim 1992; Black 1999).

Accordingly, at item number 10: 'Expression of the level of confidence', respondents might use their own measurement to indicate their level of confidence. However, the measurement from one person might not be the same as another. So, how could we compare the results on the same basis? In this case, (Black 1999) states that instructions should be stated clearly, and clarification of each level should be made for respondents to choose. This would help respondents give answers on the same, or almost the same, measurement.

Open-ended questions

In item number 14, I asked respondents to express their expectations about the computer system at the Faculty by using open-ended questions.

3. Please specify your expectation about the computer system at the Faculty.
   - .....
   - .....
   - .....

Figure 5-3: Open-ended question

While designing this questionnaire, I consulted with my colleagues who were academic staff at the Faculty and had experiences in developing questionnaires for years in their researches. I had been warned from them that most of the respondents did not want to answer open-ended questions. However, to get answers for a question like this, I could not avoid open-ended question. When I received the questionnaire back, I was so excited to see written data appear against this question. Almost all the respondents expressed their ideas about expectations of the computer system of the Faculty. Although most of the responses were short answers, they were meaningful.

Dichotomous question: problem with third option

In item number 9, see Figure 5-4, the respondents were asked to indicate their needs for training. I employed dichotomous question or binary question in this situation to get a yes or no response.

9. Please specify types of programmes in the following list that you have ever used before and indicate whether you need training or not.

Types of Programs	Have you ever used?		Need training?	
	Yes	No	Yes	No
• **Word Processors** (e.g. CU-writer, RW, MS-Word, …)				
• **Spreadsheet** (e.g. Lotus, MS-Excel, ...)				
• **Presentation** (e.g. Power Point, …)				
• **Database** (e.g. Dbase, FoxPro, FoxBASE, MS-Access, …)				
• **Statistic** (e.g. SPSS, Epi Info, Stat View, …)				
• **Browser** (e.g. Netscape Navigator, Internet Explorer, …)				
• **Reference Programs** (e.g. Endnote, Reference Manager,)				
• **Other** 1. ……..……....				
2. ……				

Figure 5-4: Dichotomous questions

When I got the questionnaire back, I discovered that the results from asking a question like this did not serve my purpose. First, I merged two questions together; 'Have you ever used these programs before?' and 'Do you need training?'. These two questions were designed as binary questions. For the first question, if the respondents answered that they had experience using a program, it was still difficult to indicate the level of experience that they had. This also happened to the second question when the respondents were asked to identify their need for training. If the respondents answered no, there was no indication why they did not want training. Did they not need training? Did they prefer other methods rather than training? Perhaps the training programmes that had been provided for them did not serve their purposes. Apparently, using only binary questions was inappropriate since additional information was required. Other types of questions, such as rating questions, open-ended questions, should be added here.

Layout of the Questionnaire

Designing a layout, such as in Table 5-3, should be considered in order to accommodate respondents' answers without causing any error-response. Since the table was very condensed, error-response could happen easily.

Processing Questionnaire Data

Coding or a classification system should be considered together with designing the questionnaire. This would be very helpful for transferring data to a computerised process and would also ensure validity of the data. After data input to the computer, data cleansing should be done before analysing it. In terms of data analysis, statistical analysis and analytic skills were required. Selecting appropriate statistical methods to use with appropriate data types is another matter that should be taken into account. This should be planned from the design process where quantitative data is required.

2.3. What the Pilot Questionnaire Tells Me.

Results from the questionnaire revealed that academic staff had been forced explicitly and implicitly to move closer to technology. In part, they were driven by the Faculty's policies, while another part came from society and the younger generation. Computers had now spread to many countries around the world including Thailand. Children were inevitably exposed to this technology. The proliferation of Internet cafés all around the country was obvious, and the majority of the customers were children of school age. Concerning the academic staff revealing that they had computers at home and connected to the Internet from home, most of them had children in the age range of 12-17. The relationship between these two factors needed to be investigated further, since the number of respondents at this stage was insufficient to indicate anything clearly. However, according to these results, the potential for peer-to-peer contact, particularly from family, for influencing the acceptance of technology, and stimulating the respondents to participate in the world of technology is great.

In accordance with the results from the pilot questionnaire, it became apparent that the respondents were in the stage of learning how to operate computers and other technologies, but had not integrated these into their teaching yet. Almost all the respondents had positive attitudes towards computers and were willing to learn more about how to operate computers properly. Some respondents stated that they needed training courses. Some of them were not very satisfied with the services that had been provided by the Computer Centre and expected the network to be more up-to-date. Accordingly, findings from the questionnaire ascertained that the faculty members were very concerned about insufficient hardware and lack of technical support. However, some questions remained unanswered by the results of the questionnaire: why could sufficient hardware not be supplied; why did most of the academic staff not employ computers in their teaching; was there any support from the Faculty to motivate them to use IT; what are the expectations of the Faculty for the academic staff in terms of IT; in which direction should the Faculty move in terms of using IT; and how could the Faculty exploit IT in terms of teaching and learning purposes?

Unavoidably, the Faculty policies and planning became involved in this issue. The strategic aims, direction of the Faculty, and the direction of the university in terms of using IT from the administration's perspectives needed to probe further. Conducting the pilot questionnaire was unable to reveal this. There was another layer underneath the picture that should be explored, and looked at from different angles rather than only from the academic staff's perspectives. This kind of information required another approach. Therefore, in this circumstance, I employed interviewing as a research tool.

2.4. Pilot Interview

Two administrative members of the Faculty were approached and agreed to be interviewed. One participant was responsible for Strategic Planning and Development, while another had the responsibility for Administrative and Human Resource Management. Eight open-ended questions were prepared as an interview schedule:

1. What are the meanings of IT and telecommunication technology?

2. What is the perception of using information technology and telecommunication technology in nursing education?
3. Why are these technologies important?
4. Does the Faculty have any policies (either at present or in the future) to support these technologies or not? If so, how?
5. Does the university (Mahidol) have any policies or any plan to use the technologies? How?
6. What are the benefits that will be gained?
7. Are there any problems or limitations if these advanced technologies are brought to the Faculty?
8. What are the factors that influence this matter?

Questions had been prepared with the aim of using them as a guideline for conducting the interviews (see Appendix B). Each interview took about 20-30 minutes. All participants had been asked for permission verbally to use a tape-recorder in the interview before it was started. Analysis of these interviews is shown below. Direct quotations from the interviews are shown in italics.

Faculty of Nursing (FoN) Context

The Faculty of Nursing at Mahidol University, founded in 1896, was one of the highly prestigious and excellent nursing institutions in Thailand (Charoenyooth, Tilokskulchai et al. 2001). As a leading nursing institution in the country, "…The Faculty of Nursing is concurrently responsible for the preparation of educators, administrators, clinical experts, and researchers who serve as leaders in the nursing profession." (Charoenyooth, Tilokskulchai et al. 2001, p.3). Nowadays, the Faculty has been appointed to be the centre of thirteen collaborating nursing institutions, "…9 colleges under the supervision of the Ministry of Public Health, 3 colleges under the supervision of the Military, and another one under supervision of Bangkok Metropolitan." (Kalaya 15/12/1999)

Nursing Education: Quality gap

An important reason for establishing collaborating institutions was to bring the educational standards at nursing colleges up to the same level, as it appeared that

there was a quality gap in nursing education. This did not only happen between nursing institutions in urban and in rural areas but also among the nursing institutions across the country. In addition, graduating from the nursing institutions in urban areas was more highly lauded in our society than graduation from rural institutions. Since technology had come to play an important role in human lives, there was an expectation that technology could be one of the solutions to mitigate these problems.

> *"If such technology can be launched, nursing education from the capital city will be disseminated to rural area, and the quality of education will be increased. It will be the same level, or almost the same.... Together with the quality of graduated students."*
>
> *(Samorn 30/04/1999)*

Once the connection among the institutions had been established, it was anticipated that knowledge would be transferred (Kalaya 15/12/1999) and experiences would be able to be shared (Kalaya 15/12/1999). In accordance with these activities, cooperation among nursing professional bodies would be increased and the standard of learning should be improved. Students were expected to obtain the same quality of learning and graduate with no difference whether they were in an urban or rural area. Students' negative attitudes concerning graduation from different nursing institutions, particularly in rural areas, should thus be reduced.

> *"... we can solve the problem of the bad attitudes of nurses about graduating from different nursing institutions. Such feeling will be eliminated. Nursing institutions will be the same or almost the same. ... The idea to help each other to improve our profession will arise."*
>
> *(Samorn 30/04/1999)*

In order to reduce the 'quality gap', collaboration had to be established among nursing institutions and with the Ministry of Public Health in terms of networked infrastructure across the country. There was an expectation that, with the networking technology, collaboration would become strong, knowledge could be transferred across the line, and the quality gap would be reduced.

> *"Actually, we have many collaborating nursing colleges, which should get benefits from these. We should get the cooperation from the Ministry of Public Health. There are many collaborating nursing*

colleges that link with us under Mahidol University either Ramathibodi or Siriraj (names of the campuses at Mahidol University in Bangkok). If we can join together by linking with optic fibre or whatever, we can share our experiences together. Suppose we had a case that is rarely found and it had been found in a ... province. We could send messages to each other and share this experience together. On the other hand, if something like this has happened in Bangkok or we've got some advance knowledge, we can share this in our network. Especially in nursing education, we should go together in the same way. Our knowledge should not be much different. ..."

(Samorn 30/04/1999)

Market and Policy forces

It became clear that the Faculty would like to keep its position at the forefront and technology had been counted as part of the institution's high performance.

"...If we don't use it, ... it doesn't only mean that we are not advanced enough. Indeed, we are stepping backward!" (Samorn 30/04/1999)

Implicitly, the Faculty had been forced, on the one hand by the global market to move along with the technological wave, and, on the other, it had been forced to move with the wave by the policy. The technological movement did not affect only the Faculty. It had also been addressed in national policy from the Ministry of Education who took responsibility at the school level; the Ministry of University Affairs who took responsibility of Higher Education; and the Ministry of Public Health who held responsibility for the National Health Care System across the country. As a university under the Ministry of University Affairs, Mahidol University had integrated this policy into the university's plan. Faculties and institutions under the university's umbrella had been affected by this policy.

"...Our university set up training courses for staff many times. Management teams have to be trained together with senior lecturers."

"...The university will provide Internet for academic staff to search for information...they would like us to have a tool to build up knowledge."

"...Since the Ministry of Education launched policies about this, many faculties in our university had just begun to develop something in this regard. Once we went together to visit the Faculty of Science, do you remember? A conference between Salaya (a campus of Mahidol University in Nakornpatom, about 45 minutes from Bangkok -- author) and Payathai (another campus in Bangkok where the Computer Centre had been located – author) was established. It's an interactive conference and we could see each other. At the Ministry of University Affairs, they also have many projects like this. So as the Ministry of Public Health, they conduct a lot of projects relating to these technologies."

"...They demonstrated an operational process to audiences and how to do case consultation by using this tool. More than ten thousand audience [members] participated in this conference without travelling from their campuses, which usually are far... far away. It's not necessary to stay in the same place because this network is very...very wide."

(Kalaya 15/12/1999)

It was part of the university development plan to establish new regional campuses and connecting them all together with the existing one. In addition, to support the national policy in educational equity, the new campuses had been planned to locate in many provinces outside Bangkok.

"We have new campus at Kanchanaburi (Western region) and plan to establish further at Armnartcharoen (Eastern region) and Nakornsawan (Northern region)" (Kalaya 15/12/1999)

The university's networked infrastructure was first completed in 1998. The faculties, colleges, and institutions under the university were required to prepare a networked

installation along computer hardware and software for staff and students to have online access. An internal communication among campuses was established after the connection of the four main campuses.

Technological change had, thus, been introduced to the Faculty of Nursing. The networked infrastructure had been implemented, and new computers had been provided for academic staff, students, and administrators.

Information Technology (IT) at the Faculty

The Faculty had developed its own IT-Master plan, which was also correlated with the IT-Master Plan of the University. Within this plan, the number of computer hardware that the Faculty should have would be calculated in proportion to the total number of students and the total number of academic staff at the Faculty. A list of required software had also been stated in the plan. This would be considered as a guideline for the next 2-3 years (Kalaya 15/12/1999). Although planning had been developed, some crucial obstacles were mentioned, for instance, a lack of budget and lack of experts.

> *"...we have no material, no money, and no manpower..."*
>
> *(Kalaya 15/12/1999)*

> *"... The problem at this moment is budget. Budget is a crucial reason why we can't do anything. Another reason is we are lacking of experts. We also need technicians to take care of this. We would like to do this but don't have the staff to do this for us, so we get stuck. We would like to do this and broadcast this to students who stay in other wards or stay in urban and rural areas, but the cost is very high. And conducting such things we need staff...but we don't have them, we don't have money, and we don't have technicians who have sufficient knowledge and abilities to do this."*
>
> *(Kalaya 15/12/1999)*

The 'experts' that were mentioned here seemed to be only technicians that knew how to handle hardware, but it seemed to exclude how to make use of the technologies in teaching and learning. At this stage, although handling hardware problems seemed to

be the administration's main concerns, many problems regarding accessibility, reliability, and bandwidth still existed.

Regarding how the Faculty made use of the IT, from the administration's point of view, it was obvious that the initial purpose for using IT was to facilitate academic staff and students searching for information on the Internet. Administration had anticipated that teaching and learning by using network technology would happen in the next step, and this could serve a large number of students and reduce the workload of academic staff (Samorn 30/04/1999). Although it had been stated that the Faculty aimed to use IT to enhance teaching and learning, there was no strong evidence to show that IT had been integrated into teaching and learning. It appeared that the Faculty had not reached that stage yet. Perhaps, we were just in the early adoption. The academic staff used computers for document processing, analysing data, and searching for or retrieving information. However, not all academic staff embraced the use of computers; there were many issues relating to this. As one of the participants stated,

> *"...It might be because we can't do it and we are not skilful enough to do it. Another reason is because we have a lot of students at this moment. Our lecturers don't have much time to think about anything. It looks like we work day by day, over and over. And this is one of the factors. I think, in the long term it will be gradually changed because it is very useful." (Kalaya 15/12/1999)*

Issues concerning motivation, policy support, together with age range had been raised.

> *"... Our faculty? Well, only a few people that have visions. This is the point. If our faculty would like to do this, motivation is needed. It might be a stimuli...I don't know. But from the policies? Well,... Do we have young members of staff that are active in this regard? And how many new academic members will suffice to bring us success? If you expect this from the elders, it is rather impossible. You see, how many people whose ages in this level (points at herself) can use computers by themselves without any help? If they are in the process of continuing study, particularly persons who are going to study abroad, they will use computers 100% when they come back. Because they have to lean on*

> *themselves! If they don't do like that, they will not survive. It is not a small issue. An individual has to be trained to have this concept. [The] young generation will understand this technology very fast." (Samorn 30/04/1999)*

This implied that accepting change would take time and need to start from the conceptual level. Indeed, 'power' was required to make change happen (Kalaya 15/12/1999).

Three main external organisations had been raised in the pilot interview: the Ministry of University Affairs, the Ministry of Public Health, and the Nursing Council of Thailand. The first two played crucial roles at Mahidol University in terms of policies and management, while the latter influenced the Faculty directly. The Ministry of University Affairs was responsible for higher education and all universities across the country; whereas, the Ministry of Public Health was responsible for the National Health Care System. As a leading medical university in the country, Mahidol University had a strong connection with these two Ministries, one arm as a public university under the Ministry of University Affairs and the other arm as a medical university that produced medical and health related professions for the country. In addition, there were three main university hospitals under the responsibility of Mahidol University: Siriraj, Ramathibodhi, and the Tropical Medicine Hospitals. These hospitals also played crucial roles in Thailand and provided services from primary to tertiary care.

Another external organisation that had directly influenced the Faculty was the Nursing Council of Thailand. This organisation, in collaboration with the Ministry of University Affairs and the Ministry of Public Health, had responsibility for the standard and quality of nursing education across the country.

The specific roles of these external organisations need to be probed more in terms of how they became influential in the Faculty context.

2.5. Analysing the Interview Data

At the time, analysing text-data was very new to me. Experiences from coding and contextualising data had changed my 'lenses'; indeed, they showed me dimensions of the data that I had not seen before.

Strauss, A.L. (1987) calls the stage of coding transcript by scrutinising it 'line by line, or word by word' as 'open coding', and illustrates this process by starting with 'conceptualising data' (Strauss, A.L. and Cobin, J., 1990).

> By breaking down and conceptualising we mean taking apart an observation, a sentence, a paragraph, and giving each discrete incident, idea, or event, a name, something that stands for or represents a phenomenon. (Strauss and Cobin 1990, p.63)

All the 'codes', were written alongside the relevant line of the data transcripts. Codes would not necessarily come from a single word or phrase that we used to interpret the data. Words and phrases from the interviewees themselves could be my codes. For instance,

> *"If such technology can be launched, the dissemination of nursing education from Capital City to rural area will occur, and the quality of education will be increased to be the same or almost the same level, ..." (Samorn 30/04/1999)*

Words and phrases such as 'dissemination of nursing education, capital city, rural area, and quality of education,' have been counted as codes. Strauss named these kinds of codes as '*in vivo*' codes (Strauss 1987), since the actual words from the interview were chosen.

Apparently, some questions, ideas, and comments came to my mind while generating codes. I noted them along these codes with different colours, just to distinguish them from the codes. In this regard, Strauss and Cobin explain that the open coding procedures had two analytical procedures, such as making comparisons and asking questions (Strauss and Cobin 1990).

After finishing the initial coding, I transferred all codes to a coding sheet, and collated notes, comments, and questions on another separated document. The coding sheet

was very useful in helping me organise and categorise data. When grouping data into categories, each category was named. But – where did those names come from? For me, those names came from the 'in vivo' codes, literature reviews, and from my own ideas. Under each category, there could be subcategories. Each category and subcategory had its own properties and dimensions. For instance, in the 'quality gap' category, I had this list of codes: urban and rural area, IT-skill, nursing standard, be recognisable in society, and pollution. Each code has its own attribute, for example high/low 'IT-skill', high/low 'nursing standard', high/low 'be recognisable in society', and high/no 'pollution', see table 5-7.

Table 5-7: Quality gap of nursing education between nursing institutions in urban and rural area.

Urban	**Rural**
- ↑IT-skill	- ↓IT-skill
- ↑NS-standard	- ↓NS-standard
- ↑accepting in society	- ↓be recognisable in society
- ↑pollution (=environment problems)	- no pollution

Categories and subcategories could be linked together by using attributes. In addition, this could happen between categories.

2.6. Lessons from Pilot Interview

Although it was my first interview in the fieldwork, I felt comfortable and confident because the interview was conducted in Thai, with my people, and at the Faculty of Nursing –my workplace. I was not a stranger to them, and I was familiar with the Faculty and Siriraj campus since I had graduated there and become a professional nurse at Siriraj Hospital[13] for five years before returning to the Faculty as a member of the academic staff for the last few years. I was confident that I could handle the situation in the interview well. However, being an insider could cause disadvantages and problems such as those outlined in the following paragraphs.

Some questions that had been prepared, according to the interview schedule, could not be addressed directly. I needed to adjust some of them by using appropriate language,

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[13] Siriraj Hospital – is one of the largest university hospitals in Thailand. As part of Mahidol University, it is located at Siriraj Campus. The Faculty of Nursing is just on the opposite side of the campus road.

just to ensure that I did not offend them unintentionally. This issue had been recorded in my field note:

> *It was not difficult to approach the Dean or Assistant Dean and ask those questions that I'd already prepared for interview. Because the interview was conducted in Thai, I hadn't had any problems at all in communicating with them. Although it was the first time that I conducted an interview with the person who was in a higher position than me, it didn't scare me at all. I knew her before and knew how to approach her. However, it appeared that some questions were too difficult to ask regarding her position. For instance, I would have liked to ask her about the meaning of IT in her view and how she perceived the meaning of IT. I could not ask her directly. It seemed to offend her as if she did not understand much about IT. I was in the position of young staff, and it was impolite to do that in our culture. Yes, I knew that I was in the role of researcher as well, but still I was seen as a very young staff [member]. I had to modify the question and make it softer in her sense.*
>
> *(Fieldnote 10/05/1999)*

It appears that I was influenced by the participant's roles since they were all members of the administration, and I considered their roles to be higher than mine. In addition, they were all senior academic staff, and they knew me since I was an undergraduate student at the Faculty. In general, we have a very strong Thai culture that expects that young people should pay respect to the elders, in particular parents, relatives, and teachers. When I came back to the Faculty and became a faculty member, it was as if I had come back to my school with teachers around me. Although my role had changed to be their colleague, from their view, it seemed as if I was seen partly as a student. Briggs (1986) calls this 'social roles' and points out that it is one of the procedural problems in interviews. He states that if this problem can be identified, it will help researchers, as a retrospective tool, in sharpening their analyses of interview data (p.59). Burgess, R.G. (1984) points out that this is a problem of being an insider. I did not recognise this until I had begun transcribing the data and listened to the interview tape again. It appeared that when I adjusted the interview questions, purposes of the questions had been changed. For example, in my interview schedule,

I planned to ask 'what are the meanings of IT and telecommunication technology?' However, I could not address the question as it was, as if I humiliated them, as illustrated in the field note transcript above. I had to adjust the question to be:

> *'...Regarding bringing IT and telecommunication together to use in education, could you please explain your view and your understanding about IT and telecommunication technology to use in our Faculty' (Samorn 30/04/1999)*

> *'I would like to ask you about IT in your understanding, could you please tell me about using IT and telecommunication technology in nursing education?'(Kalaya 15/12/1999)*

However, I felt that I could not get the answers to the questions that I wanted. I was wondering what would be an appropriate way to approach this kind of question, particularly when asking for clarification of meaning. Spradley, J.P. (1979) states 'don't ask for meaning, ask for use'. He explains this point based on the relational theory of meaning that

> '...when researcher asked for meaning, the informant almost always responds with brief, referential definitions. But when researcher asks for use, informants reveal relationships between one term and many others.' (Spradley 1979, p.82)

He also acknowledges that this principle will lead directly to decoding the full meaning of something that the researcher would like to know. I found that my worrying about this question kept occurring before I had started the open coding and discovered that he was right. Many codes came out about the meaning of IT from the interviewees' perceptions and description of use.

Despite preparing questions for the interview schedule, those could not be sequenced as they were in the list. I was falling into the line of interview conversation, and I could not interrupt the interviewees when they were elaborating relevant issues (Lofland and Lofland 1995). However, this does not mean that I could not ask all the questions in the interview schedule. Since I knew all of those questions and had a clear purpose of the interview, it was not necessary to follow the sequence as shown

on the list. I could address questions appropriately to the situation in the interview, and this made the conversation flow smoothly. However, having asked the question did not mean I would get the answers. Interviewees sometime shifted the conversation to other subjects and left questions unanswered, either intentionally or unintentionally. Other interview techniques should be employed in this regard. For instance, bring the interviewee back on track and re-address the question, or address the question by paraphrasing it (Spradley 1979; Kvale 1996).

Unintentionally, two questions had been asked at a time. For instance, I was expected to ask about the importance of technology, but it became *'... From your point of view, how important is this technology? Why is it important in your opinion?'* The participants did not answer both questions; either one or the other could easily be missed out.

Transcribing data was another experience that I learned from this pilot interview, and came to understand deeply that it consumed time. Transcribing the data made me realise that simply focusing on words in the conversation and transforming them to text could filter many things out. Non-verbal communication, such as facial expressions and body language, should be included in the transcript to assure proper interpretation. However, how could those utterances be embedded in the transcript? I learned from this that I should write fieldnotes immediately, before and after conducting each interview when the scene was still fresh in my memory (Tesch 1990; Miles and Huberman 1994; Coffey and Atkinson 1996).

In my case, the transcript had to be translated from Thai into English before coding. This made me realise how data could be distorted/filtered because of the language structure (Kvale 1996). Culture is embedded in language and could not be easily replaced by other languages (Tesch 1990). Tesch (1990) illustrated that language is not only for conveying messages but language is also embedded with culture. An obvious example is the use of pronouns in Thai and English. For instance, when Mr A and Ms B talked together, in English Mr A would use 'I' to refer to himself, while in Thai he had many choices of pronouns to choose from depends on who he is and to whom he is talking. Each pronoun he has chosen would illustrate gender, imply the distance between him and the other person, and could refer to class, age range, and atmosphere of the conversation. When Mr A referred to Ms B, he still had many

choices rather than only using 'you' in English. This example could help explain some relationship between interviewer and participant in my case, and express the level of trust and openness that they had with each other, and this relationship could contribute to the reliability of the data. In regard to reliability and validity of qualitative data, Denzin and Lincoln (1994; Denzin and Lincoln 2000) mention that the researcher should not rely only on one source of evidence. However, this could be taken as part of the evidence but would need additional sources of information to confirm its reliability and validity or perhaps require further investigation.

3. Preliminary Phase Summary

Results from the Pilot Questionnaire and the Pilot Interview illustrate clearly that national policies, Mahidol University, and the Faculty itself have supported employing technology in the Faculty. The administration expect that technology is going to bridge the 'quality gap' in nursing education among nursing institutions across the country, together with increasing the educational opportunity for nurses. In addition, technology is expected to increase the flexibility of learning in terms of time and place and that it will also enhance teaching and learning in many ways.

After MUC-Net had been expanded and had connected every faculty and every campus together in 1997, the Faculty began to establish its Local Area Network (LAN). The administration had attempted to supply hardware and other related devices to serve the Faculty members' demands. Academic staff, nowadays, acquire IT-skills in order to operate computers properly and expect to employ such technology to enhance their teaching. There is an initiative, according to the pilot questionnaire, to ensure that some members of staff employ computers in their teaching. However, the data presented here is insufficient to explain how the computers have been employed in the classrooms.

It is likely that the Faculty is now in the early stage of technological adoption and looking for appropriate direction to exploit the technology and integrate it to serve teaching and learning purposes. However, how can we know which direction will be appropriate for our faculty? Technology and innovation require high investment,

whereby the administration, policy-makers, or decision-makers always expect high return. Of course, nobody can guarantee a complete success. To reduce the risk of failure, it is better to learn from others' experiences. I, therefore, looked for institutions that had already implemented technological innovation, for teaching and learning purposes in particular, and wanted to explore how they implemented such innovation; how they prepared before implementation; what kinds of challenges happened along the way; and how they handled those challenges. Results from this empirical evidence helped me conceptualise ideas and understand how to introduce this innovation to the Faculty from an initial stage to an institutionalisation of the innovation process.

In summary, conducting the preliminary phase has provided me an opportunity to learn more about appropriate research methods, develop an understanding of research design, and explore a different journey that I have not seen before. It was so different from scientific and quantitative background that I had.

Chapter 6: Research Design –Phase 2

1. Main Phase: Study Design

Results from the preliminary phase in Thailand, as shown in the previous chapter, illustrate clearly that the Faculty of Nursing (FON) at Mahidol University was in an early stage of the innovation process. Its focus fell mainly on providing hardware and acquiring IT-skills. However, further steps beyond this remained unclear. One good indication was the investment in technological hardware, such as the increasing number of personal computers (PCs) in the Faculty from approximately 10 PCs in 1995 to 179 PCs in 2001 (Faculty of Nursing, 2001). Accordingly, all members of the staff were encouraged to attend IT-training courses, provided by the Faculty, from the beginning to the advanced level. This was the first time in the Faculty's history that training courses such as these had been made extensively and continuously for a couple of months, and subsequently five or six training courses, at a minimum, have been running regularly in the years after.

Not surprisingly, a similar situation to this seemed to appear almost everywhere across the country. The budget for new technological hardware had just become visible in organisational plans in most of the academic institutions and organisations in the public sector (ONEC, 1999). The Report from the Office of National Education Committee in Thailand (1999, p.14-15) revealed problems of educational technology in the country and pointed out that government seemed to focus on hardware investment without considering software development or the preparation of proper human resources, such as experts, researchers, and academic staff. Information and Communication Technologies (ICT) appeared to serve a communication purpose, with less attention on cognitive development and educational purpose. Even so, the number of Internet users in public universities was still very low when compared to the number of users in private universities; commercial and technical colleges; high schools and grade schools; government and state enterprise; private sectors; and individuals (KSC, 1997-1998).

These clear indications illustrate the educational and technological innovation process in Thailand, particularly in the public universities, and that we are now in an early stage of the process. Thus, it would have been unlikely for me to find cases in higher education in Thailand that had already implemented this kind of innovation in their institutions. Since my study programme is based in the UK, it seemed better to exploit this opportunity to explore academic institutions in this country or other European countries around here. However, despite increased choices for case selection, issues concerning languages and culture were inevitable and became complicated. Details will be discussed later in this chapter after the 'cases' are identified.

2. Case Study Approach

Unlike quantitative studies that emphasise measurement and analysis of relationships between variables (Denzin and Lincoln, 2000), this study is based upon qualitative research and seeks to explore people's experiences in a specific context. In this regard, Becker (1970) ascertains that

> ...We cannot understand the effects of the range of possibilities, delinquent subcultures, social norms and other explanations of behaviour, which are commonly invoked, unless we consider them from the actor's point of view. (Becker, H.S. 1970, p.64)

Accordingly, one of the most fundamental characteristics of the qualitative research is:

> …its express commitment to viewing events, action, norms, values, etc. from the perspective of the people who are being studied. … The strategy of taking the subject's perspective is often expressed in terms of seeing through the eyes of the people you are studying. (Bryman, 1988, p.61)

A qualitative approach seemed to be more applicable to my study in many aspects. Not only could its 'flexibility and lack of structure' (Bryman, 1988) accommodate the study, but outcome from this stage would lead me to conceptualise an implementation model that would be employed and would be devised to fit into the institutional

context in Thailand. Unlike the 'scientific method' where the research strategy should be designed in advance, a qualitative approach is relatively open and unstructured. It, then, enhances the opportunity of coming across entirely unexpected issues. In this regard, qualitative researchers seem to favour an approach in which the formulation of theories and concepts proceeds along with data collection rather than formulation in advance of beginning their fieldwork (Bryman, 1988; Miles and Huberman, 1994; Cohen, Manion et al., 2000).

To conduct the qualitative research, it is unavoidable for researchers to become involved in the research process and become part of the research tool. Data would be analyzed on the basis of an interpretive approach. In this regard, my background, culture, and experiences that I as a researcher bring into the fieldwork are crucial (Denzin and Lincoln, 1994).

However, the advantage of the qualitative study in terms of its flexibility seemed to be a difficult part for me in the beginning because of my scientific and system design background. For instance, to me, a clear study design and theoretical framework should be formulated and seen thoroughly before stepping into fieldwork. Indeed, I planned to organise everything and expected to finish each piece of work sequentially and in a time frame that I had drawn up. Leaving things less structured and making myself ready to accept the uncertainty that could happen at any time seemed to be difficult for me. It took me sometime to realise the nature of the study that partly relied on the social dynamic and technological change. It is unusual to design and prepare everything in advance, as nobody knows what will happen in the fieldwork. It is unpredictable. However, it does not mean that the researchers will step into fieldwork without a theoretical background or any concepts. Many related theories and documents would be reviewed to formulate conceptual ideas before approaching the fieldwork. It should be clear that this process was non-linear, and I had just begun to realise this when I was in and out of the fieldwork. The conceptual framework that I had was not enough to explain what I had found in the fieldwork. It needed to be expanded and covered by other theories. If the framework was fixed and rigid from the beginning, I should not be able to explain what the data had told me. In this sense, it was very beneficial to keep the study design more flexible.

The case study approach is another method that has been employed in this study. Hitchcock and Hughes (1995) explain this about the case study:

> It (case study) is concerned with a rich and vivid description of events relevant to the case. It provides a chronological narrative of events relevant to the case. It blends a description of events with the analysis of them. It focuses on individual actors or groups of actors, and seeks to understand their perceptions of events. It highlights specific events that are relevant to the case. (p. 317)

Since this study aims to explore innovation and the implementation process from the implementers' perspectives, the qualitative approach seems to be a methodological choice to combine with the case study approach.

However, some arguments arise on the reliability and validity of the qualitative study in conjunction with the sample sizes, such as a single case or a small number of cases. This has led to a notion of generalisability and representativeness when comparing to a quantitative approach. Simons, H. (Simons, 1996) provokes us with a new thought by accepting the paradox between the study of the singularity and the search for generalisability. She explains that:

> One of the advantages cited for case study research is its uniqueness, its capacity for understanding complexity in particular contexts. A corresponding disadvantage often cited is the difficulty of generalizing from a single case. Such an observation assumes a polarity and stems from a particular view of research. Looked at differently, from within a holistic perspective and direct perception, there is no disjunction. What we have is a paradox, which if acknowledged and explored in depth, yields both unique and universal understanding (Simons, 1996, p.225).

Accordingly, the purpose in conducting a case study is not necessary for generalisability from the positivists' point of view (Atkinson and Delamont, 1985;

Yin, 1994; Stake, 1995; Bassey, 1999; Cohen, Manion et al., 2000; Stake, 2000). MacDonald and Walker (1975) illustrate that:

> We might say that case study is that form of research where n ≡ 1, only that would be misleading, because the case study method lies outside the discourse of mathematical experimentation that has dominated Anglo-American educational research.' (MacDonald and Walker, 1975, p.3)

In addition, Cohen and Manion (Cohen, Manion et al., 2000) assert that:

> Case studies, in not having to seek frequencies of occurrences, can replace quantity with quality and intensity, separating the significant few from the insignificant many instances of behaviour. Significance rather than frequency is a hallmark of case studies, offering the researcher an insight into the real dynamics of situations and people. (p. 185)

Unlike a study in science when formal sampling is needed and cases are expected to represent some population of the cases, this research is qualitative work that draws upon a purposive sample. It can be stated that the selected cases are sociologically representative, but not a statistical representativeness (Hamel, Dufour et al., 1993; Yin, 1994; Cohen, Manion et al., 2000; Stake, 2000).

Concerning notion of subjectivity and objectivity, issues in terms of misinterpretation of the data and bias from researchers are also mentioned. Cohen, L., Manion, L. et al. (2000) state clearly that 'it is impossible for research to be 100% valid' (p.105). In fact, bias could come not only from the researcher, but also from respondents or even data from observation and documents.

2.2. Defining a Case:

Atkinson, P and Delemont, S. (1985) clarifies that a case does not have a clear boundary. However, choosing a case to study does not represent a methodological choice (Stake, 2000).

By whatever methods, we choose to study the case. We could study it analytically or holistically, entirely by repeated measures or hermeneutically, organically or culturally, and by mixed methods – but we concentrate, at least for the time being, on the case." (p. 435)

Tesch (1990) classifies case study into two types: one attempts to derive general conclusions from a limited number of cases, while another seeks to arrive at specific conclusions regarding a single case. Yin (1994) names these 'single-case and multiple-case designs'. For me, I prefer a third: a combination of the first and second. The Faculty of Nursing (FoN) at Mahidol University in Thailand was chosen to be a case for study, which can be seen as a single-case design in a preliminary phase at the FoN. When it came to the main phase, the study sites were extended to the western countries, and eventually returned to the FoN for the final phase. The extended sites could be considered as multiple-case design that was embedded in a single-case. Issues concerning a number of cases relating to generalisability and representativeness have already been mentioned earlier in this chapter and shall not be repeated here.

3. Case Selection Criteria

Stake (2000) points out that the 'same' case can be defined differently when it has been seen from different views and in different situations (Stake, 2000). It also depends on 'methods of inquiry or interpretive paradigm' (Stake, 2000). In this study, I define the 'cases' relating to purposes of the study. Thus, I looked for academic institution(s) that had already implemented technological innovations for teaching and learning purposes, and planned to explore the implementation process from their experiences. The selected cases, therefore, would be in academic environments, higher education in particular. In addition, the cases would focus on a programme in educational institutions, which could be bachelor, masters or doctoral levels, but exclude training courses or any kinds of short course programmes. More precisely, the selected cases should be based on nursing, education, or other health related disciplines, which would have a similar context as the Faculty of Nursing in Thailand. Since the study aims to explore the implementation phase of the innovation process,

the cases must be the programmes that had passed the experimental and initiation phase. In addition, the innovation should already be implemented in the institutions, as the study would emphasize programmes that integrate information and telecommunication technologies in their courses, either synchronous or asynchronous tools, for teaching and learning purposes.

4. Searching for the Cases and Case Selection Method

Before commencing further, I should clarify here that the two institutions in the main study, and persons involved will be referred to by pseudonym. However, the institution's name in Thailand will still be addressed without anonymity, except the participants at the site that shall be anonymous, similar to others.

4.1. Searching for the Cases

A term 'tele-learning' came to articulate my idea since I read Professor Betty Collis' book, 'Tele-learning in a digital world: The future of distance learning' (1997). Collis introduced this term to convince readers about unavoidable technologies that would emerge and change academic environments as well as teaching and learning methods. However, many points were still unclear to me, particularly how to transform tele-learning into practice, and how to make this change happen. These questions drove me to probe this concept, and the first exploration was the project at the University of Minerva in the Netherlands, Professor Lauren Cole's workplace. During the implementation process, Professor Cole and her colleagues had published many publications relating to this project. Those documents had reflected implementers' perspectives and became evidence that helped me see pictures from their lenses (Bryman, 1988). The Tele-Learning project was established in the Faculty of Educational Technology at the University of Minerva in 1997. Although the faculty's discipline was not nursing, it was still based on an educational discipline in higher education. But most importantly, the term 'tele-learning' had its origins there. This is the main reason why it was chosen to be the case.

As mentioned earlier, I preferred to have at least one case to be a nursing school that had a setting similar to the Faculty of Nursing (Siriraj) in Thailand. Since my study

has been performed in the UK, it was likely to have UK-based cases rather than USA or Canada. However, there are a large number of nursing schools in the UK, how would I know which one had employed technology in its courses? Which keywords should be used for searching? The term 'tele-learning' or 'tele-teaching' may not be an applicable keyword search, since these terms do not have an agreed-upon definition yet. Rather, a term 'Distance Learning (DL)' seemed to appear in tandem on the Internet. Perhaps this term was related to the term 'tele-learning'. I then began my search in a distance learning web database to see how many distance-learning courses appeared in nursing education.

Explore Distance Learning Courses

Searching in web database by using keyword 'distance learning' and 'nursing' revealed that sixteen universities or nursing schools appeared on the list, as shown in table 6-1.

Table 6-1: List of Nursing Institutions from Distance Learning Database Website, search by keywords 'distance learning' and 'nursing'

Names of Institutions
1. South Bank University
2. Robert Gordon University
3. University of Derby, UK
4. University of Hull
5. University of Bradford
6. University of Sunderland
7. University of Ulster
8. Royal College of Nursing
9. University of Liverpool
10. Napier University
11. Farnborough College of Technology
12. City College Manchester
13. University of Dundee
14. University of Glamorgan
15. University of Greenwich
16. University of Leeds

My initial approach began by sending email to course administrators requesting course information and the name of course organisers for further contact. Only a few replied, and some of which indicated that they did not have distance-learning courses.

It seems too early to conclude anything at this stage, but at least this is an obvious incident to illustrate reliability of the information on the web. The persons who replied to email might not be the same person who uploaded or were involved in the content on the website, hence might not know about course details. In other words, he/she may not be the right person to answer this. However, it is clear to me that this method was unable to lead me to the information that I wanted, and 'technologies' were not necessarily integrated into the DL courses.

Contact British Computer Society:

While exploring the distance learning courses, I also searched for nursing organisations that had been involved in technologies. I came across the British Computer Society website and found that there was a specialist group in nursing. Perhaps that would give me a clue as to nursing institutions that could be my cases. After contacting the organisation by email, I received a reply, recommending that I contact the School of Nursing at the University of Primrose and the School of Nursing at Manchester University, and two or three names were suggested for further contact.

Explore National Project "Computers in Teaching and Learning" (CTL):

Meanwhile, I also came across a national project named 'Computers in Teaching and Learning (CTL)', which had been implemented by the four Higher Education Funding Councils of Wales, Scotland, Northern Ireland, and England. The CTL was based upon subject disciplines across the UK, and the Nursing and Midwifery Centre was one of 24-subject centres that started in July 1995 and was based at School of Nursing and Midwifery, The University of Primrose. It seemed to me that the Centre's role was relevant to the case selection criteria that I proposed.

> 'The main role of the Centre is to support teachers of nursing and midwifery across the United Kingdom in developing and maintaining the use of technology in teaching and learning. It is the Centre's role

> to find out what is going on in the field of computers in teaching and then disseminate relevant and useful information to its 'constituency'[14]

The Centre did not provide any degree programmes, except short course training occasionally. Thus, the Centre itself was not my case, but after exploring the Centre's activities and its staff, it appeared that they came from a group of people who played an important role in technology at the School of Nursing at the University of Primrose. Indeed, two of them were the ones who were recommended by the British Computer Society, Nursing Specialist Group. I presumed that since they had led the CTL and the Centre was based at their school, there might be a link to tele-learning, though different terms may be employed.

I searched for their names on the Internet and found that their personal web pages illustrated qualifications, areas of interest, and academic activities along with many publications related to integrating computer and technologies in nursing education. This looked relevant, and I determined that it could be the case study.

4.2. Case Selection

There are several types of case studies. For instance, Yin, R.K. (1994) classifies case studies into three types: descriptive, interpretative, and evaluative. Merriam (1998) categorises case studies into four domains: ethnographic, historical, psychological, and sociological. While Stenhouse (1985) divides case studies into four types: an ethnographic case study; an action research case study; an evaluative case study; and an educational case study. Stake (2000), categorizes case studies into three types; an intrinsic case study; instrumental case study; and collective case study.

In this regard, the Faculty of Educational Technology at the University of Minerva could be considered to be an intrinsic case study. Stake defines an intrinsic case study as one in which the researcher wants a better understanding of this particular case. It is not only that the case represents other cases or illustrates any kind of problems, but also because the case itself is 'of interest'. This institution has been chosen because it

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[14] See: http://www.shef.ac.uk/uni/projects/ctinm/index.html

originated the term 'tele-learning' and had conducted 'Tele-Learning Project' at the university. Above all, the term 'tele-learning' had prompted my interest and inspired me to probe the term in detail. Concerning an instrumental case study, Stake (2000) explains that it will be a case that provides insight into an issue or 'to redraw a generalization'. In general, an instrumental case study plays a supportive role and facilitates the researcher's understanding. Additionally, it helps the researcher pursue an external interest and advance understanding of that interest. In this regard, the School of Nursing at University of Primrose could be an instrumental case study that would lead me to a better understanding of the nursing education context, similar to the Faculty of Nursing at Mahidol University in Thailand. That would be beneficial in the final phase of the study when I should attempt to conceptualise the model and devise the conceptual framework for the Mahidol context. The instrumental case, however, could be seen as another intrinsic case, since it comprises several interests, particularly in nursing subject disciplines. In terms of the collective case study, Stake (2000) explains that it has less intrinsic interest in one particular case. However, a researcher tends to study a number of cases in order to investigate a phenomenon, population, or general condition. In this circumstance, the study falls more on the first two types, rather than the third, although one case somehow falls into both types. For example, the School of Nursing at the University of Primrose that has been considered an instrumental case might be seen as an intrinsic case, since it comprises several interests, particularly in the context of nursing. Stake, R.E. (Stake, 2000) describes that:

> "Because the researcher simultaneously has several interests, particular and general, there is no line distinguishing intrinsic case study from instrumental; rather, a zone of combined purpose separated them." (p. 438)

5. Data Collection

5.1. Evaluating sites

After the two cases had been selected, identifying respondents together with approaching strategies needed to be planned carefully for each selected site. Since the study focused on the implementation of innovation by looking at the implementers' experiences, I needed to assess who the implementers of the educational and technological innovation at each study-site were and how to convince them to participate in my study. Having prior knowledge about the settings and implementers' background was very important. It would not only increase my confidence and leave me feeling more competent, but it would also increase the potential for cooperation from the respondents, as if we were talking in the same 'language'. The level of acceptance seemed to be higher. Approaching strategies on how to present myself to keep the flow of information coming will be elaborated in the new section, as will the methods of inquiry, such as interview, e-interview, observation, and documentation, that I employed in the study.

5.2. Data Collection Methods

Having explored the CTL in Nursing and the School of Nursing at the University of Primrose, and the University of Minerva, I had the names of key persons and contact addresses from staff lists; these were persons who had been involved in implementing innovation in their institutions. A 'snow-ball' concept was employed (Biernacki and Waldorf, 1981), so those key participants would be asked to recommend or nominate colleagues to participate in the study. General information of the nominators, such as biographies or autobiographies, publications, and the like would be checked or explored to reassure that the individuals were applicable to the study before approaching them.

Because the participants generally had roles in both academic and management positions, not surprisingly they were very busy. It would be unlikely that I could arrange appointments and revisit them very often. Although interviewing would be a tool for collecting data and proved to be appropriate in this study, as shown in the preliminary phase, it was still inadequate to serve this circumstance. There should be some tools that could provide more flexibility and less intrusion and which could be

fitted in this context. This led me to an idea of transforming the nature of the interview by employing technology, that is email, in order to overcome this barrier, and I called it the 'e-interview' Details of these tools will be elaborated in the following section of this chapter.

Documentation is another important tool for data collection in the study. As well as expressing their views while talking, such as in the interview, e-interview, informal conversation, or group discussion, people also write. Texts are about *"people's thoughts, feelings, memories, plans and arguments, and are sometimes more telling than their authors realize."* (p. 132). Data sources, such as institutional websites, project websites, webpages, or publications such as annual reports, strategic plans, project plans, and the like in both electronic and non-electronic formats are also very useful and help in triangulating data with interviews in some respect. Thanks to technology and the Internet, which create additional windows of opportunity, capturing text, particularly in electronic format, is much faster and easier.

5.3. Interview and E-Interview

Cohen and Manion (2000) state about the interview that:

> "It (Interview) is not concerned with collecting data about life: it is part of life itself, its human embeddedness is inescapable." (p.267)

The interviews in the preliminary phase had appeared as a practical pilot study that allowed me to gain some interview experience before approaching the main study phase. Employing a questionnaire was insufficient to help me explore data in depth. The study aims to probe issues about implementation and innovation management, and asking sensitive questions about policies, and management in particular, is unavoidable. To have this kind of data, a level of trust and openness between interviewer and interviewees should be established to some extent. The nature of the questionnaire approach is not strong, nor appropriate in this point, but an interview is. Its nature is interactive (Kvale, 1996) and gradually helps the interviewer probe into

dimensions of the data that stay underneath by using strategic enquiry (Kvale, 1996; Denzin and Lincoln, 1998).

Establishing a high level of trust with the respondents was crucial in this context (Denzin and Lincoln, 1998). In addition, disclosure could not happen easily. People mostly would have limitations on their level of openness and would tend to create an invisible distance to some extent with persons they had just begun to know, particularly for the first or even second time. Developing strategies to approach respondents was another interesting experience from which I learned.

However, conducting interviews in English was something that I had to consider since English was not my first language. Language was really a matter in fact, particularly in interview (Burgess, 1984), as Spradley (1979) ascertains, "language enters into every phase of the research process." (p.17). Besides, as Spradley describes, it included culture in itself. In addition, notions of the 'insider' and 'outsider' perspectives (Spradley, 1979) became involved. It was obvious that language as a non-native speaker would inhibit me from picking up some of the meanings in a face-to-face interview, and a lack of confidence in conducting the interview fluently might make the interview less successful. Indeed, respondents' positions, such as project leader, centre director, and the like would make it much more difficult to arrange appointments, and in particular, revisiting for frequent interviews. This inconvenience included both time and place.

However, using email as a tool for interviewing could be one of the solutions; it had the potential to solve these problems and increase flexibility in terms of time and distance. In fact, it would be less intrusive in many respects. An e-interview would change the mode of interview from synchronous or real-time into an asynchronous mode. With this advantage, it would also provide respondents a convenient time to compose replied messages and revisit their answers many times before pressing the 'send' button. It seemed to me that with this method, language would be less of a problem as it should be easier for me to respond. In addition, using email gave me more time to think of the implication of their response and post a new question. Thus, the advantages of email interviewing outweighed those than I could gain from face-to-face interviewing. Although at that time references to support or guide me

through this method were scarcely found, I decided to employ e-interviewing as a tool for data collection in the main phase of the study.

The initial letter was composed with an aim to introduce myself, and explain about the study together with inviting them to participate in the study.

> "…I am a Lecturer from Mahidol University, the Faculty of Nursing, Thailand. At present, I am studying for a PhD in educational computing at King's College, London, and Professor Deryn Watson is my supervisor. My investigative study focuses on developing an implementation model of tele-learning in an educational institution for use in Thailand. At this stage of my study, I am looking for the persons who manage and teach in educational programs that integrate information and telecommunication technologies to facilitate teaching and learning in higher education, particularly in nursing education."

The letter had been delivered to two scholars at each main site. I employed a non-probability sample method called 'snowball' or 'chain-referral' sampling (Biernacki and Waldorf, 1981; Cohen, Manion et al., 2000) to put me in touch with other participants; it is a useful method that has been employed where access is difficult. The first participant will be asked to suggest or recommend other participants. Hence, in the initial approaching letter to the two scholars at each site, I had put this in the last part of the letter.

> "…As mentioned above, I intend to interview about four staff, currently I have only your name and ……. Could you please give me names and email addresses of your colleagues who participate in your programs and integrate information and telecommunication technologies to facilitate teaching and learning as you do. …"

Surprisingly, almost all of the participants replied to me the following day with an expression of willingness to participate in the study. That seemed to be a very good sign of cooperation, and, indeed, was a very good start for me. Although a great deal of literature and theories had been reviewed, and large amounts of related documents concerning participants and the study-site had been read and re-read for sometime

before sending the initial letter, I was still nervous. One of the difficulties was I did not know how to present myself to the participants, and I was also aware that English was not my first language. Still, language was another matter. In this sense, it was a written language rather than a verbal language as normally found in face-to-face interviewing.

Once the first letter had been delivered, the e-interview process began. At the University of Primrose, two participants had been approached for the first round, and another three participants had been recommended. After the second approach, two participants had accepted my invitation. So, I had four participants in total from the first site. Meanwhile, at the University of Minerva, six participants had been approached, but only two responded in the first round. Another three participants had been recommended, and only two had responded in the second round. The second site, therefore, had four participants in total. In summary, there were eight participants to be approached.

Data collection in this phase had been continuing for about 5-6 months. During the process, contact among the respondents had gradually ceased; only two respondents from the University of Primrose and three respondents from the University of Minerva had continued participating towards the end of the process.

Before starting an initial approach, an interview schedule had also been prepared as a semi-structured interview. Twelve questions for probing in-depth had been created for the interview schedule, and the questions had been divided roughly into three groups. Actually this was for the three rounds approaching; three or four questions would be asked at a time when sending out messages.

6. Method of Analysis:

6.1. Coding

After messages had been sent out, the asynchronous interview as asynchronous conversation had began to flow. Since it was email based, it came in the form of electronic text, transcribing interview would be omitted in this sense. However,

coding was not much different from what I had done in the preliminary phase; contextualise, decontextualise, and recontextualised were performed in the same manner. Theme results will be illustrated in the following chapter.

7. Lessons from Fieldwork

7.1. What had been happening in reality?

The study employs information mainly from the Internet and uses the Internet as a window for information to search for cases. If people do not advertise themselves on the web, this study will definitely be faced with some difficulties.

It is clear to me that in conducting qualitative research like this, the study design cannot be completed in the early stage. A combining method seems to be unique in each study. However, in this study, I had a clear aim only of what I wanted to do in the beginning, and 'how to do it' was still unclear. When I began to approach fieldwork, I had planned many items beforehand, but it appeared that those could not be delivered when they came into practice. Many factors were beyond my control, and increasing flexibility in the study design helped me get through this obstacle. As long as I had a methodological concept in my mind, and as long as reliability and validity had not deviated from the methodological point of view, it should be acceptable. For this reason, it is obvious to me that qualitative research is not only a method that helps me conduct research, but also increases my knowledge about research methodology. Accordingly, it is a process of self-development, since the researcher would be considered a research tool, avoiding bias was not easy. Bias can happen in any moment of data collection and analysis, but to minimise this, I learned to step off the stage and become neutral as much as possible. Obviously, it is unlikely that one can be absolutely neutral since we implicitly bring in our experiences, cultural, class, gender, racial, and social identities, and the like, all of which shape the process of inquiry.

Flexibility in research design makes the qualitative approach much more appropriate for studying about human and social interactions that are dynamic and always changing. For instance, in the study I chose to conduct e-interview to avoid the

language problems of face-to-face interviewing, but apparently, I had to employ face-to-face interviewing with one respondent. Although I expected that busy respondents would appreciate responding to me at their convenience, one respondent had a heavy administrative workload, and answering email back and forth was still inconvenient. It is obvious that one method does not always suit all tastes. Surprisingly, the face-to-face interview that made me worry in the early stage went smoothly without any language problem.

Chapter 7: Implementing Change in Practice

As described before, deciding to develop and implement change in higher education institutions is not easy. Results from two selected case studies, one in the UK, and another in The Netherlands will be illustrated in this chapter. Here cases will be presented from an implementer's perspective. Data had been collected mainly by e-interviews, and partly from face-to-face interviews and corresponding documents. It is important to note here that a group of implementers in this situation also act as change agents in their institutions. I will explain this case by case, and will discuss what we have learned from these two cases at the end. Results from these cases shall give us a clearer picture about the strategies or models they employed in implementing change in their context.

1. School of Nursing and Web-Based Learning at the University of Primrose, UK

1.1. Institutional Context

The School of Nursing at University of Primrose began its history from five schools of nursing and one of midwifery. In 1990, these schools were merged into one college. There were still nine teaching sites across South Yorkshire and North Derbyshire, linked together with a network line for real-time access to a college management information system, which retained records of staff, courses, placements, and all student data. Computer laboratories were provided on each site for students' use, and laptop computers had been introduced on a loan system for teacher use. Having their own system, the school was much more independent and could continue their pioneering work (Sherman, P. 03/07/00). The school had implemented their own email and telephone system, so staff and students could access Campus 2000 (a dial network) for email, online learning, and file transfer. It seems to be a golden period of the school. It should also be noted here that the school was concerned about technology, and "had started to make the teaching staff computer aware and literate since 1988" (Sherman, P. 03/07/00).

In 1995, the school was an independent College of Nursing and Midwifery, but had major changes in management and became a school under the University of Primrose. There are now three remaining sites (Sherman, P. 03/07/00).

After becoming part of the University in 1995, the school seemed to decline 10 years:

> When we came into the university (1995) we went back 10 years as the infrastructure was not available to continue much of our pioneering work
>
> (Sherman, P. 03/07/00)

The school had to begin developing dial-up access with the university again, and subsequently introduced Virtual Learning Environment (VLE) software, WebCT, to the university.

> We have since worked with the university to develop dialup access to the university's intranet and introduced WebCT to the university.
>
> (Sherman, P. 03/07/00)

> [Three] Years ago I came to Primrose and shortly after arriving I heard about WebCT which allows you to deliver web pages to students, but also allows other things like email, online chat and student management. After demonstrating it to others in the university it became increasingly popular.
>
> (William, C. 17/05/00)

> It was not fully or well planned. [Three] of us [William, C..], [Sherman, P..] & myself wrote a document setting out how important IT was going to be as part of moving from 9 sites to 3 and this was accepted by the school executive (without them having too much understanding of the technicalities). It mostly concerned wiring and the provision of PCs for both student and

> staff use. The university network was (and still largely is) based on win 3.1 although this is now changing
>
> (Tyler, M. 09/05/00)

Yet the school preferred to be:

> The School also likes to be at the forefront of developments and as you can see puts in money to support such a position.
>
> (Sherman, P. 03/07/00)

Technology seemed to increase performance in some respects, and money had been put in to support this need. For instance, new academic staff with web skills had been appointed, and an investment in a video link project among three main sites had been continued and subsequently completed with success (Sherman, P. 15/06/00). Now, students from three sites can learn clinical skills through a video link without geographical problems. Having said that, administrators had launched a new idea to increase wider access for students and also to increase learning flexibility, hence introducing a concept of VLE and WebCT. The definition of the term VLE was not really clear:

> The difficulty is that many people want to just put their lecture notes on the web and call this distance learning. Creating a good networked learning product is, I believe, more complicated and should use a mixed media approach - using the appropriate medium for the message
>
> (William, C. 17/05/00)

At the time I collected this data (June 2000), a concept of learning at any place any time was still in argument. However, the benefits of having IT gives a potential to increase consistency in teaching; incorporate theory and practice; and increase interaction in student learning. Additionally, an external force had a great impact on both policies and practice. IT policy within the National Health Service (NHS) influenced the nursing curriculum, and students were expected to have IT literacy skills after graduation (Tyler, M. 14/05/00) .

> We are teaching the students about health & nursing informatics so changes in information management practices in healthcare (and particularly the NHS - where students gain most of their experience & jobs), are relevant.
>
> (Tyler, M. 14/05/00)

At the end of 1998 the "Information for Health" strategy was released

> (Tyler, M. 14/05/00)
>
> If even some of the objectives are achieved it will bring about major changes in information collection, storage, analysis & dissemination in the NHS - therefore we need to prepare our students for these changes.
>
> (Tyler, M. 14/05/00)

Once a web-based learning project was introduced, expectations were also raised to enhance student-learning experiences; increase learning flexibility; and reduce problems in terms of the high enrolment of students in any group, and a problem in assessment (Tyler, M. 09/05/00).

1.2. Approaching Innovation

The school introduced WebCT as a web-course tool to develop web-based learning courses to the university. WebCT is a commercial software package that requires payment for the licence, and after demonstration of its use, the software became popular. However, it took the project team about 18 months to get through the approval process of policy, funding, and software installation on the university's server system. In the meantime, the team – Sherman, P., William, C., and Tyler, M. – had prepared staff about a new concept of VLE, and encouraged them to practise new skills in developing online courses.

The team was concerned that in nursing education practical skills and competence were very important (Sherman, P. 15/06/00), and that transferring practise supervision through WebCT might not be the right choice. Hence, the selected courses to be

online would focus on courses that did not require the practise supervision, such as courses in the post-registration area and in pre-registration modules such as study skills, research appreciation, and nursing informatics. However, preparation time in developing courses took the team about a year (Sherman, P. 15/06/00; Tyler, M. 21/05/00).

1.3. Course Development

In the School of Nursing at Primrose, developing the web-based courses was a collaborative project. The implementer team had created the working environment for the academic staff, and as content experts, the academic staff did not necessarily require high IT skills. Indeed, they could leave technical issues in the technicians' hands and focus on their area of expertise instead. The web technicians would transfer content and convert it into web language (html-code), ready to display online after uploading to the WebCT (Sherman, P. 15/06/00).

To accommodate academic staff developing web-based courses, the school had formed the course development team, which comprised course content experts and web technicians. In this regard, William, C. (17/05/00) suggested that the team should be built on a multidisciplinary approach.

> … You need a good team of educators, subject specialists, editors, designers and technicians to really do this properly, as well as a national telecommunication system that can handle the information and is cheap for students to access courses (unless this is only being run over a university network)…
>
> (William, C. 17/05/00)

In some situations, the size of the course developing team could be a factor relating to the impact they could make. In this context, the three change agents, or the implementer team, who were very active in the technological area and had proposed a document to executives regarding an importance of IT towards a number of personal computers for staff and students, and cabling system, played an important role in implementing this change. However, when it came to the course development team there seemed to be very few staff working on this.

> Most of the (200ish) academic staff was not involved in the development of the online course. The 8 people who teach this theme were, but most of the work was done by 2 of us. They have had little chance to be involved in design etc - although now the course has been running for awhile many are looking at the capabilities in the areas that they teach….
>
> (Tyler, M. 14/05/00)

In terms of content editing, at that time WebCT had allowed only one editor ID and password per course. This was a limitation of WebCT that was found during that time that did not support multiple user access to help in building or speeding up web development courses. The team, therefore, had developed web pages externally by using external web editors, such as Dreamweaver and similar applications, to handle this job (Sherman, P. 15/06/00).

Unlike a traditional method, the web-based learning course, as a new teaching method, provides an alternative to teachers and students to teach and learn differently. It can be more active and flexible if a course designer has arranged it in that direction (William, C. 17/05/00).

> Networked learning has to be something that educators want to do – it takes a strong team to create materials, and they have to adapt to the new environment. Some see this way of teaching and learning as a threat, but I see it as an opportunity to remove ineffective teaching and learning strategies and to permit [a] more student centred approach.
>
> (William, C. 17/05/00)

However, the meaning of web-based learning was not clear to academics:

> The difficulty is that many people want to just put their lecture notes on the web and call this distance learning….
>
> (William, C. 17/05/00)

One of the change agents in the team referred to the web-based course as networked learning, and suggested the use a mixed media approach in developing courses. He believed that not all parts of the curriculum were appropriate for the web-based courses, and not all materials were suitable in electronic form. In addition, purposes of the materials should not be overlooked:

> … Creating a good networked learning product is, I believe, more complicated and should use a mixed media approach - using the appropriate medium for the message. …
>
> (William, C. 17/05/00)

> … There needs to be an institutional strategy to implement this kind of system, with recognition that not all parts of the curriculum are appropriate. …
>
> (William, C. 17/05/00)

Interactive media could call for student interest more than pages of text (William, C. 17/05/00). A change agent revealed that students felt they could have managed those pages with a handout.

> Interactivity became a key to delivering content, this could be through student activity and/or on-line questions, ..., as well as a glossary, hot links and discussion and/ or chat rooms….
>
> (William, C. 17/05/00)

To ensure that the developing courses met demand, the course module would have to go through many stages of testing with staff and students before launch (Sherman, P. 15/06/00).

1.4. Implementation

The web-based course provided an opportunity for teachers to make the teaching course more interactive and become student centred. Some students liked the active learning mode, while some did not (Sherman, P. 15/06/00). It appeared that positive reinforcement could help in motivating students to learn.

> Positive reinforcement also seems to help - those students who have received a response to a posting they've made on bulletin board/ in discussion lists etc. tend then to post more often in the future.
>
> (Sherman, P. 15/06/00)

In addition to developing and implementing web courses, the school had run and implemented other innovative projects, which could be illustrated here as examples of success. One was the implementation of a video link among campuses. This project had been proposed and supported by school administrators for years as part of exploiting communication technology to enhance teaching and learning (Sherman, P. 15/06/00). Another example was an implementation of a Multiple-Choice Questions System (MCQ), tested particularly in midwifery.

> The students like them as one comment was that one question at a time is shown on screen, and teachers like them as they 'mark' the MCQ and validate the questions giving tons of useful statistics that would take hours to amass manually.
>
> (Sherman, P. 15/06/00)

Some resistance to change could also be found from both teachers and students (Sherman, P. 15/06/00). Some teachers still preferred to teach in, and some in front of, the classroom. This reflected a traditional teaching method that had been employed. Some were threatened by technology and reluctant to learn new skills (Tyler, M. 20/05/00). It seemed that developing the web course would require much effort, and they were not ready to do so. On the student side, some preferred to be taught by a teacher rather than learning from a screen (Tyler, M. 09/05/00; Sherman, P. 15/06/00).

> Even with this, there remains much resistance to using this method, generally through students who have a perception that they should be 'taught' by a teacher in a classroom.
>
> (Sherman, P. 15/06/00)

IT skills were another concern that became a problem. For instance, in nursing informatics course, students were not required to have IT skills before joining the course Although some students had undertaken IT training in school or in previous jobs or courses, some had never touched a computer before (Tyler, M. 09/05/00). That would make a level of competence different and might cause a problem or resistance in classroom.

> Some students are very enthusiastic others very negative towards anything which has IT in it. – We are currently evaluating some student responses (in a variety of formats)…
>
> (Tyler, M-051400)

Recently the school has included 490 minutes IT skills sessions within the first two months of the course. This is to ensure that students have a basic level of IT skills, and can build up their confidence in using IT.

After launching a web course, unexpected issues arose incidentally. Student costs increased since learning materials mostly were transformed into an electronic format, and students wanted to print out those materials and access the Internet from home. Obviously, printing cost, including paper and printer cartridges, and online cost when access Internet from home, would inevitably be on students.

Whether they liked it or not, after taking a web course at least teachers and students would gain new skills in computer use and in information management in terms of searching skills and keyboard skills. Although this might be an unavoidable situation, teachers would implicitly increase their IT-skills if they had to be involved in developing the web-based learning courses in school.

1.5. Summary: Interesting Issues from Interviewees

Along the implementation process, the interviewees ascertained that developing web-based courses was not a cheap option. They suggested to take it seriously, and illustrated further that course development was taking time and had required much effort. In addition, they emphasized that it needed strong teamwork and appropriate infrastructure to make the system run smoothly. To implement the web-based

learning courses, the interviewees highlighted that the decision to do so should come from an institutional level and have policy support, including support from colleagues to make this move forward. Multidisciplinary teamwork would also help the development process go efficiently. Interestingly, the interviewees thought that not all courses should be transferred to web courses and not all materials should be transferred into an electronic format. They believed that the purposes of the courses and learning materials should be considered when designing and developing the online courses. Just putting anything online did not mean that it would enhance teaching or learning.

2. University of Minerva: General Profile

2.1. Institutional Content

The University of Minerva, founded in 1961, is one of the youngest universities in The Netherlands (Fisser 2000). UM has developed from a technical university into a leading research university (Jong and Teekens 2003) on the principle that brings together technical and social science studies in both education and research (Fisser 2000). UM is also recognised as an "entrepreneurial university" (Fisser 2000).

UM is situated on the east side of The Netherlands, which is not attractive to students like being in Amsterdam or the west is. In 2000, there were approximately 6,000 students and about 1200 academic staff. UM also provides fifteen programmes of study, ranging from electrical engineering and computer science to public policy and administration and educational science and technology. In this study, I will focus on the Faculty of Educational Science and Technology, since an innovation had been developed here.

In fact, this faculty was one of the first at UM to pioneer with ICT in education and has developed its own web-based course management system named TeleTL (Cole 11/09/2000; Fisser 2000). At that time, Virtual Learning Environment (VLE) applications, such TeleTL, were very new. UM had initiated an idea to develop this system based on Lotus Notes and the Domino Database platform (Fisser 2000).

I look at TeleTL as an innovation, similar to WebCT in the Primrose case. What differs between these two is that UM has developed its own application, while the Primrose case deployed commercial software to reduce the development time. Indeed, the UM case had succeeded in the implementation process within three years, a year faster than what they had anticipated. This is very intriguing. We shall see further in the following section how they managed this, what made it succeed, and how this led to, what they called, the 'institutionalise phase'.

2.2. Beginning of ICT in Education at UM

UM started using Information Communication Technology (ICT) in education in the 1980s, for instance, using Computer-Based Training (CBT), the WWW, email, video conferencing, shared workspaces, and the like. (Fisser 2000). UM is seen as:

> …the university in The Netherlands with the best technological infrastructure for students and faculty and with the most intensive use of this infrastructure.
>
> (Fisser 2000)

After implementation of the CAMPUSnet in 1995, all students living on campus had unrestricted access to the university network, including the Internet for a small charge, $7 US/ month. UM had launched a hardware preparation plan to encourage students and academic staff to be ready for the technical infrastructure and to be familiar with the new technology equipment. To make a connection to the Internet from off campus, students could use a dial-in connection, a cable system, or ADSL. In terms of hardware support, UM had announced a special PC project, in which students could purchase a personal computer at a special discounted rate, or choose to have an interest-free loan that they could pay back in 24 months. The computer help desk had also been provided to give free support and advice to students. This included a carry-in service where students could bring in their computers to for help with installations.

The university network system had allocated 10 MB network space for students to store and share files or documents without needing to carry floppy disks or notebook to the university. This network space is accessible both on- and off-campus.

2.3. Introducing the TeleTL Project

In 1997, the TeleTL project was established. It was a four-year, funded project, with an overall goal to:

> …systematically support the professional development of the faculty in terms of potential telematics applications in their teaching, and to carry out the re-design of all courses in the faculty so that education becomes more efficient, more enriched, and more flexible.
>
> (Fisser 2000)

The project had very good support from the top management. Policy was launched to form the task force, "Telematics Applications in Education" at the end of 1997. This task force had responsibility for stimulating the implementation of ICT in education throughout the university (Fisser 2000).

Obviously, it was not easy to convince the top management to understand the project thoroughly, and even harder to confirm a return on investment in something that had never happened before. So why would UM like to implement this change? It is clear that administrators, instructors, and implementers had different perspectives and purposes when looking at change. From an administrator's point of view, Cole, L (11/09/2000) explained that technology could raise the university's profile, bring recognition, and most importantly, increase the number of students, which would mean increasing the university's income.

> We already had a number of people doing…err… interesting pioneer work in our faculty, and the dean appreciated that that was bringing good recognition to the faculty. People like myself, or…err…regularly in the newspaper, and so fort[h]…being interview[ed]. So, on one hand it wasn't hard to argue with him that it was a way that profile the faculty…err… to be more systematic about this. Otherwise it's just to be pioneer like everybody. But it was his decision, not mine,

> err…to go for the steering group… That was a surprise to me…(laugh)..!
>
> I read it when I came back from vacation. Oh! (laugh)… That for him was important, and is important in the way to get new students.
>
> …and it has doubled a number of students, so….
>
> (Cole 11/09/2000)

She concluded that,

> If we hadn't had…err…the announcement by the Dean in the following September, … They would have been harder to get it.
>
> (Cole 11/09/2000)

Geographical location could be another barrier, as stated earlier in this chapter regarding UM being located in the east of the Netherlands

> "…for us, we sit in east side of the Netherlands, which is not attractive to students like being in Amsterdam, or the west. In general, the university has a low student number compared to other universities. So, we are concerned about having more students."
>
> (Cole 11/09/2000)

The project was planned to re-design all first-year courses in 1998-1999, and the same to the second-year courses in 1999-2000. Along this process, the implementer team had developed a decision support tool (DST) to:

> …help the instructor get a systematic overview of examples of different ways WWW-based tools can be used within the organisational aspects of their courses, the aspects relating to lectures and face-to-face sessions, aspects related to communication with and among students to the presentation of

> course-related materials, to file distribution and the addition of resources to the course site.
>
> (Cole 1998)

In January 2000, UM had established a new institute called Dinkel Institute (Development Institute for Knowledge, Education, and Learning) to be a central support unit of the university, and the TeleTL project was transferred to be part of a new project under this institute. The institute was established to take responsibility for the support of instructors and students using ICT in education. It also intended to improve and integrate the TeleTL system with other existing systems of UM to form an integrated digital learning environment that would be implemented to use across the university. This new project was named Ch@ir[15]. It was expected that 'within two years the whole university would use the TeleTL system for educational purposes.' (Fisser 2000)

In terms of the development team, there were three educational technologists, one full-time webmaster, one part-time webmaster, and one full-time database specialist. There were another two members: a graphic designer, and a multimedia developer. Both of them were from the computer laboratory, a central support of the UM. This team initially began to serve the Faculty of Educational Science and Technology internally, but eventually, after transferring to the DAN Institute[16] and integrating to the Ch@ir project, the team was expanded to be ten people, with similar work functions, and served across the university.

2.4. What can TeleTL do?

It should be restated here that the TeleTL system is a kind of Virtual Learning Environment (VLE) application that was developed on Lotus Note and the Domino Database to create a new virtual learning environment for instructors and students. TeleTL was developed to provide academic staff and students the ability:

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[15] Pseudonym is applied.
[16] Pseudonym is applied.

> "…to be more flexible…and also for educational reasons, …and to have more active students. Students will be more engaged…"
>
> (Cole 11/09/2000)

In addition, it gave an opportunity for instructors and students to create new learning styles. Evaluation results at the end of the first year of implementing the system illustrated that students felt they had more flexibility. The learning environment that TeleTL had created had a web-based interface, so students could access their courses anywhere ranging from on-campus, at home, or even when they were away, they were still able to access the courses and learning materials as long as they could access the Internet. Indeed, the evaluation results revealed that TeleTL had increased interaction between students and instructors in both quantity and quality (Fisser 2000). Students became more active and more engaged in their learning process (Cole 11/09/2000).

2.5. TeleTL Approach – Leading to Success

After three years of implementation, the project moved into the 'institutionalise phase'. Cole defined this term as

> "Institutionalise we mean that's now becomes the way that everybody's operated. It handles by the ordinary supporter, …staff…, not a special project any more, …just what people do."
>
> (Cole 11/09/2000)

There comes a point of satisfaction when the implementers could change people from having a negative attitude regarding change to adopting and accepting it (Cole 11/09/2000). Being only a pioneer was not enough, planning and implementing strategically were also vital (Fisser 2000). It was clear that the project implementers had approached the top management level and had full support on policy and budgeting during the implementation process. Launching the task force, "Telematics Applications in Education" in 1997 could be a good example.

The project had also provided training and support ranging from an Internet connection to hardware and software to redesigning courses and training instructors to be familiar with a new learning tool and learning environment. These could help increase the learning curve and subsequently increase the adoption rate. Another interesting strategy was to arrange a small team to approach instructors to help with redesigning courses on web-based learning system, though that seems to require much time and effort before completing the tasks.

A clear example of success, for instance, is an effective project management that shortens a four-year timeline to only three years. In addition, change had subsequently been expanded from the faculty level to across the university, and interestingly, the adoption rate appeared to be high.

It should be noted here that the concept of a 'virtual university' that UM employed was not purely 'virtual'. They still believed that face-to-face contact between instructor and student should be continued during the whole learning process of the student. They did not expect to have every course running online and isolate students from instructors or keep them totally away from campus (Fisser 2000).

2.6. Summary: Interesting Issues from Interviewees

An interesting point that should be mentioned here regarding technology that possibly motivating teachers to teach more, one interviewee revealed that from her experiences it had not:

> …we have data from watching instructor time quite carefully with our 40 instructors last year at the time that they spent. And the instructors who spent a lot of time were instructors who would be spending a lot of time anyway. There are people who always spend a lot of time in teaching and really try…they are very innovative and involved. Many instructors didn't spend much time at all
>
> (Cole 11/09/2000)

Additionally, when asked whether VLE would reduce teachers' workload, again the same interviewee indicated it would not. These reflect practical experiences that the interviewees had been through. Succeeding in implementing innovation in their case does not mean that technology can do everything. An obvious successful issue that should be pointed out here is shown in the evaluation results at the end of the first-year of the implementation. The results illustrate that interactions between teachers and students were increased. In addition, the results highlighted that students were more active and began to participate more in a virtual environment. Students had the impression they were receiving high quality feedback from teachers, but there was some trouble for teachers since they were expected from the students to stay on the other end of the line when the students needed help.

3. Discussion: What do we learn from these two cases?

3.1. Why Change? Transferring Vision to the Top Management

Results from these two cases illustrate clearly that the top management of the organisation is an important factor that influences the implementation process. We have learned from these cases that the expectations from top management of the organisation may not necessarily be the same as those of change agents, and of course different positions could have different visions. However, to make the implementation go smoothly and effectively, change agents and top management or administrators of the organisations should see the same picture as to where the innovation could lead the organisation. The problem is how to transfer the vision that the change agents have to top management.

In an organisational change process, it is obvious that resistance and confusion always develop because people are unclear about the future state.

> …Thus the goals and purposes of the change become blurred, and individual expectancies get formed on the basis of information that is frequently erroneous. In an absence of a clear image of the future, rumors develop, people design their own fantasies, and they act on them. (Nadler 1993, p.93)

This is an interesting issue that I have learned here, as we can see that Minerva was successful in this process, while Primrose was not. We will start focusing on the administrators of the universities and clarify their expectations when bringing change to the organisations, and what they did to support change. The main point here is for the change agents to match what the innovation can do to serve the needs of the university administration, and then begin transferring the idea and vision about the innovation to them.

It should be clear from these two cases that although the innovations were initiated by change agents from schools or faculties of universities, their approaches were different. These differences led the innovations to different levels. One was expanded to cover the university level, while another maintained their focus at the school level, which created change in different scale thereafter.

In the case of Primrose, change agents at the School of Nursing expected that using web-based courses would increase learning flexibility in terms of time and place, as well as increasing awareness of academic staff in exploiting technology in teaching and learning. In addition, they expected that the innovation would be able to minimise the problem of high numbers of students in groups, problems in assessment, and potentially reduce teachers' workload in some respect and that it would also help in preparing students for the practical environment. Importantly, it could reduce geographical problems by connecting three separated campus sites together. External forces also involved in this case, for example impact from NHS and its IT-policy, influenced the nursing curriculum. The change agents were expected to prepare students to be ready to serve marketing demand. In regard to institutional needs, the change agents of the Primrose case, as explained, scoped change at the school level. They reflected the vision of the school administration in bringing the school to the forefront and using technology to increase the school's performance, therefore 'putting money in to support this change'(Sherman, P. 03/07/00). Concerning support from the university level, it was difficult for me to get access to or obtain any substantial evidence to clarify this point. However, it is not right to make any claim at this stage that there was no support from the university in implementing the innovation. At least, the university had purchased the WebCT licence to have it run on the university IT system, and academic staff from any schools or faculties under

the university premise, not limited to School of Nursing, could make use of this application. This can be considered as a kind of support from the university. Nevertheless, it seems to me that this is insufficient to make any change happen at the university level in short.

In the case of Minerva, change agents had made it clear about the university requirements regarding technology and this innovation. They reflected a concern that the university administration had and revealed that management would like to overcome geographical disadvantages, since the university was situated far away from the capital city and might not be able to compete with other universities situated in more convenient locations. Hence, raising the university profile to attract students was a clear objective of the administration. Increasing the number of students obviously means increasing the university income. There was evidence clearly illustrating that for years the university had put a lot of investment into implementing technology as well as using it in teaching and learning. It is perhaps, the change agents' needs as well that would like to be pioneers in using ICT in education. This seems to go along well with the vision of the university administration. And this is the point. It should be considered a good start for the change agents in this case before attempting to transfer their visions about implementing an innovation to the university administration. It was not just at the Faculty level anymore. Thus, unsurprisingly they could easily push through proposed changes to the project and could have support from the university administration in terms of policy and budgeting. With this approach, the innovation had been implemented across the university, and change had been scaled up to the university level.

However, as stated in many change management theories, having top management of the organisation see the same picture as change agents proposed is rather difficult. The change agents at Minerva did achieve this job, but this did not happen in the Primrose case, although the change agents at Primrose had tried very hard and put much effort into this. I can see that Minerva had many advantages in this point. An obvious one is that the university background was science and technology, and this could lead to the university culture and the leader vision when it came to making a decision regarding investment and developing policy to support this change. It is likely that the university administration of Minerva were familiar with the advance of

technology and had a clear vision of the benefits that technology could bring to their organisation, but that is not so with the Primrose case. It is important to refer to the change agents at the School of Nursing, University of Primrose, when they mentioned the school IT-policy that they had developed and proposed to the school administration. They thought that the school administration did not understand much of what they had written. When asked about school policy to support the use of WebCT, the change agents revealed:

> "It is a policy without delivery"
>
> (Tyler, M. 09/05/00)

However, it would be unfair if only the change agents' voices were heard, while the school administration side is overlooked. It should be reiterated here that interviewing is not the only source of data in this study. Official documents, reports, and other related evidence have also been collected and included in the analysis, but in this situation I found no evidence to support them or to argue back. What happened to the change agents in the Primrose case afterward can reflect the level of support that the school had provided to the change process in terms of policy, planning, and budgeting. It should be noted here that the change agents in Primrose case looked at IT infrastructure only within their own school, and did not intend to expand to the university level as appeared in the Minerva case.

3.2. Top-down VS Bottom-up Approach

It is clear to me that the Minerva case had been succeeded in convincing the university administration to support implementing the change project. Having the top management support like this, the Minerva had employed top-down management flow to approach implementing the change process. This is similar to the *top-down model* of change that I had referred to in Chapter 4 – Innovation and Change. Although policy-driven could help deliver organisational change, it did not necessarily deliver innovative practice (Smale, 1998). However, the top-down approach seemed to work well in the Minerva case and was effective in three years, which is very intriguing.

Primrose hardly transferred vision to the school administration, and therefore received less support from the school policy including budgeting. The change agents in the

Primrose case had to find a way to survive on their own, as usually appears in a bottom-up approach. However, it should not be argued that the Primrose case was not successful in this implementation. They were just rather slower when compared to the Minerva case.

There are some interesting factors that become involved in these two different approaches, and worth illustrating in details here: different scale of change, roles and position of the change agents, communication channels, and resistance to change.

3.3. Scale of Change

Evidence from the Minerva and Primrose ascertains that the scale of change has an impact on the speed of change and adoption rates. This scale of change relates to the size of the organisation and the history of the organisation. Below is a summary of data from the two cases that highlight these points.

- Start the same level, but progress in different scale.
- Small scale = reduce complexity?
- Small scale = increase adoption rate?
- What small scale is really small?
  Size of School NS, student no. = 3,000 (U. Primrose = 20,000)
  Size of Faculty of Edu Tech = 270 (U. Minerva = 6,000)
  Should consider facilities that the organisations could provide,
  How quick to respond to change if large no. of students.
- High external factors had also influenced process.
- Impact = reduce flexibility to manage change.

- Size of organization: This factor should also be considered. There is evidence illustrated that a small organisation has high movement and can respond to change faster than a large organization.
  - Primrose: total no. of students 20,000
    (School of Nursing = 3,000)
  - Minerva: total no. of students 6,000
    Faculty of Edu Tech (TO) 270
- Long history/background of the organization: Organization that has longer history would take time to respond to change when compare to a new established organization.
  Primrose: University founded 1905 (merged with School NS in 1990)
  Minerva : University founded 1961

3.4. Role and Position of the Change Agent

In these two case studies, we should not forget that the position of change agents and their roles in implementing this change are different. Hence, different approaches had been employed. In case of Primrose, the change agents were a team that had self-interest in technology, and they believed technology had the potential to enhance teaching and learning. Their active roles and contributions to the nursing community gave me a picture of their enthusiasm and high degree of IT literacy. Perhaps

establishing the CTL Centre for Nursing & Midwifery[17]at the University of Primrose in 1998 could be evidence of that. Though it was not a large amount of money gathered in higher education through the CTL project, the centre's activities could reflect how enthusiastic the academic people were, particularly in nursing across the country, and who intended to make use of technology in their subject area regardless of institutional boundaries. Having been recognised by the nursing community across the country, the founders of the CTL Centre for Nursing and Midwifery had also played an active role and become change agents at the School of Nursing, University of Primrose. They were the same group of people who introduced WebCT to the university, as stated in the first part of this chapter. Although they might be well known in a group of IT in nursing at a national level, it was insufficient to convince the administration at their institution. It appeared that they did not fully succeed in transferring an innovative idea that they proposed. Providing network infrastructure for the school and university could be an example of this. It took them for years to put this plan into action.

From their perspective, as change agents, it was vital for the school administration to understand technology well and exploit it effectively in an organisational context. They anticipated seeing this appear in the strategic plan of the school as well as to be delivered in action. The change agents thought that policies should be announced to support actions, and that the budget should also be allocated to support the operational plan. This, from the change agents' view, could reflect the vision of the leaders and the future direction of the organisation. Regrettably, the change agents' hope to induce momentum of change could not get through. Only a small group of staff could keep this active rhythm, while the school has continued on a slow pace. The change agents, indeed, felt they had not been recognised by the administration for what they had been doing, and thought that was due to the administration's lack of understanding of technology. They eventually proposed a report to explain a future plan regarding how important technology would be for the school and students, and

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[17] CTL (pseudonym) is a 3-year national funding project supported by JISC funding during 1998-2000. As an initiative project in JISC-national framework, the project had been expanded to a certain limit due to size of the funding. It was eventually transformed to be the Learning Teaching Support Network (LTSN) in 2000. Supported subject disciplines were re-categorised and the centres were hosted by higher education institutions across countries. Nursing was formed with other related subject and stayed under the LTSN Centre for Health Sciences and Practice based at King's College London during 2000-2004.

what the school should do to support this change. Apparently, the report had only a little impact. They could have some support by having a technician to accommodate this work, but staff time was not inclusive, nor was training for new skills, and, as of yet, there is no clear policy to support their work. It is not surprising that in this situation the proposed change could not happen quickly, and that managing change would be difficult.

In the case of Minerva, the change agents had high academic profiles. This is an important factor that could convince the administration and policy-makers to listen to what they said, and see the vision of what they proposed. This is an obvious example of how to make use of external communication in the change management process. Organisations mostly consider the importance of the public media, such as newspapers or television programmes. The staff who has been recognised by the public media raise their credibility and personal profile (Rogers 1995), but also implicitly raise the organisation's profile. That helps making the change agents' voices louder in the executive committees. Once the administration and change agents could clarify the 'picture' or vision of what they would like the organisation to be, it was easier to move forward and develop a plan to support actions thereafter. Cooperation with the administration could then be established, and messages could be conveyed.

3.5. Communication channels

Communication channels are another important issue that should be considered, both internal and external channels. In the Minerva case, the external communication channel became involved. The TeleTL project leader had a high profile from a public perspective, hence the project profile was raised. Her credibility could help convince the policy-maker in this situation; whereas, Primrose had not exploited the external communication channel much. The level of convincing could not be strong enough to attract the policy-makers, nor could their visions be visible or transferred. Support for Primrose then was limited to the faculty level, and among small numbers of team members, not a central support unit at the university level.

The School of Nursing at the University of Primrose had been recognised in their own subject discipline and should not be compared with the University of Minerva at the

university level in terms of utilising external communication channels to support the change process. Insufficient support from the public media to raise the academic profile and personal profile – both at the national and international levels – could create an impact in terms of credibility for the change agents to transfer vision to the top administration of the organisation. Nevertheless, it reduced the level of interest that the top management could give to this issue, and that may have led to a lack of support on policy and budgeting. These will affect the adoption rate in the innovation process and make it rather slow.

Minerva, in contrast, had a high profile in public relations, thus having raised the organisational profile as well as the personal academic profile. Publications at national and international levels can also support and strengthen the academic profile.

From Rogers' perspective, external communication is implied as the way the change project has been marketing itself to the public. Public media, such as newspapers, television, and academic journals, could be considered to employ. Internal communication channels can be seen as communication between change agents and the executive committees, and between change agents and other organisation members at the operational level.

Communication in terms of peer-to-peer approach will increase cooperation at the operational level and make people's decision to adopt change easier. A lack of policy support to drive change can generate less cooperation vertically and horizontally.

In the "innovation process in organisation" that I mentioned in Chapter 4, Rogers (1995) refers to how the communication channel at different organisational levels can affect how people in the organisation accept change. His explanation illustrates that both internal and external communication have a strong impact on developing cooperation, and cooperation can influence how people decide to accept and adopt change. He maintains that interpersonal communication is as important and not less than top-down management or policy forces in decision-making process for accepting change. Although there is no direct evidence to support that policy force could help peer-to-peer collaboration work better, it should be considered that policy sometimes can generate a better working atmosphere as well as facilitate group work at different

organisational levels. That would open opportunities for organisation members to work together or increase usage of the internal communication channel. Resistance to change would be reduced if establishing peer-to-peer communication conveys positive messages or carrying positive attitudes towards the acceptance of this change.

In this case, the change agents had been trying to use both vertical and horizontal approaches to manage change, but it seems what they could have done was to employ a 'bottom-up approach'.

3.6. Resistance to change

There could be a variety of reasons for resistance to change. For example people have a need for a certain degree of stability or security and change disturbs this; change presents unknowns that cause anxiety; imposing of change on individuals can reduce their sense of autonomy; change can possibly threaten persons who have power in the current situation, (particularly when they have a vested interest in the status quo); some believe the way things are done currently is better than the proposed change (King and Anderson 1995). Whatever the reason is, Nadler (1993) suggests guidance to overcome this barrier by increasing the need to motivate change. His assumption is based upon the principle that if people are satisfied with the current state, they will not be motivated to change. An 'unfreezing' stage has to be stimulated, and people need to be pushed out of their inertia in order to be 'receptive to change'(Lewin 1952; Bennis, Benne et al. 1976).

> The more the pain and dissatisfaction with the current state, the more the motivation to change and the less the resistance to change.
>
> (Nadler 1993)

When this stage has been shaken, the next step that should be brought in is to build in participation in the change. Findings from many studies ascertain that this can help reduce resistance to change (Coch and French 1948; Judson 1991; King and Anderson 1995). Participation can also facilitate the communication of information about what the change will be and why it has come about. Although sometimes participation can take time and may create conflict, it appears that participation can lead to obtaining new information from participating – information that may enhance the effectiveness

of the change or the future state (Nadler 1993). There are many different stages where participation can be involved: diagnosing the present situation; planning change; or implementing change.

Thus, what happened in the Primrose case, with the resistance to change that the change agents experienced (Sherman, P. 15/06/00) is not unusual. Resistance to change at any level in the organisation always happens during the process of change. As Nadley explains, the need to motivate change is required, and participation in the change development process or in the implementation process can also help reduce resistance to change. What the diffusion of innovation (Rogers 1995) and the change management spiral model (Smale 1998) explain is that the initial stage is similar to what Nadley illustrates above, and not different from what Lewin explains in his three-stage model, unfreeze-freeze-refreeze (Lewin 1952). For instance, in the change management spiral model, Smale (1998) indicates that during the initial idea of change we should consider, "for whom is what a problem". This will lead to the core question of the innovation triangle, 'what changes, what stays the same'. It may be a basic question, but reflects the idea that we should analyse innovation; map people to identify all the key players; and understand organisational context clearly before stepping towards the complicated stages of change. The innovation triangles provide us a firm ground with which to take a holistic approach by bringing in an individual-systemic approach, as well as by linking human resource management, communication theories, and teamwork, with a principle of organisational culture and management.

In the case of Minerva, it had been recognised as a successful change with good cooperation at every organisational level. However, evidence from the change agents revealed that they also had to face academic staff who did not want to accept any change (Cole 11/09/2000; Fisser 2000). Policy support from the top management of the university helped them in this case; otherwise, the adoption process might have been longer than it was.

However, it should be noted that there was very little evidence illustrating negative results in the Minerva case. It was probably that the project was fully successful, and the implementation process went on smoothly without any problems. On the other

hand, it could be that nobody wanted to reveal about these issues outside the campus. There might be some documents saying negative results about this project that I could not access. But why might it be like that? My assumption is that the strong leadership and dominating characteristic of the project leader at Minerva might influence what other team members might say about the project results in public. Still, it is just an assumption, and we should not make any conclusion too early.

3.7. Readiness and Continuity of Technological Infrastructure

Institutional background and its technical infrastructure are essential for the development of this kind of innovation. This is obvious from Minerva and Primrose cases. Having a strong background in the sciences, engineering, and technology, Minerva had many advantages in terms of its well-established, ready technical infrastructure from the first. Technical infrastructure is obviously fundamental, and it is a base on which other systems build (Van den Branden and Van der Perre 1997; Corn ford and Pollock 2003). The administration of Minerva have considered this as an image of the university, hence, they invested in keeping themselves abreast of technology (Cole 11/09/2000; Fisser 2000). Indeed, technology was an integral part of their institution; hence, this has made them react to the technological change very quickly. The change agents there would not require, therefore, much time to transfer their vision and convince the administration to develop policy in support of their plan.

Unlike Minerva, Primrose appeared to be hindered in the development process due to the two times the system infrastructure declined in the timeline: first when the three Schools of Nursing merged; and second, when merging with the University of Primrose (Sherman, P. 15/06/00).

However, the readiness of technological infrastructure is not the only matter; continuity and maintenance of the technological infrastructure and related systems should also be considered.

3.8. VLE and Pedagogy

Domination of VLE in E-Learning

VLE development in an early stage was criticised that it was developed and delivered based on a modularised concept. There was an argument that designing VLEs seemed to be technical-driven, which influenced learning design and course development. Findings from the TLRP review report also indicate that VLEs were designed and developed from with technical-minded concept, without including user analysis, and by assuming that the technical-minded developers understood well what users wanted. The report continues by stating that students were overlooked in participating in the design process, and weren't asked what they would like or how they used VLE.

Concerning an impact of VLE design, some academic staff argued that VLE had not been designed to support student-centred learning. Indeed, it may be inapplicable for some study programmes that prefer students to be more independent and able to select any sessions of the interested subjects to attend and learn at their own pace. Implementing Bodington[18] at the University of Oxford is a good example in this case. It was presented at a conference[19] that the University of Oxford had been exploring proprietary VLEs for sometime, but found the structure of system design did not match with the learning style at the Oxford:

> Oxford went through a long procurement process for a VLE/LMS system. We needed one that accommodated our complicated teaching structures and did not pigeon-hole students into modules and courses, as interdisciplinary studies are encouraged here. It needed to be easy to use, scalable, and with proven reliability across a 15,000+ institution" [20]
>
> Dr Stuart Lee, Head of the Learning Technologies Group, University of Oxford.

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[18] Bodington is an Open Source VLE developed at University of Leeds. See: http://bodington.org/index.jsp

[19] Dr Paul Davis presented "Introducing Boddington at Oxford" in Bodington Buzz: Introduction to the Bodington VLE System, 19th November 2004, University of Oxford.

[20] See: http://bodington.org/art_casestudy.html

Academic institutions that employed Bodington illustrate that the design of Boddington provided academic staff more flexibility in terms of course development and unlocked them from a modularlised design concept, and most importantly, they highlighted that it supported student-learning requirements.

The development of open source VLE, such as Bodington, is merely an example of a new design of the VLE. It provides users an alternative; in the meantime, it has provoked them to think about their needs, what they really want from their teaching courses, and what the VLE can do for them. It appears that issues in relation to teaching and learning have gradually been pushed forward, and have shifted the technology-driven concepts aside.

3.9. Pedagogical Holes

Pedagogy seems to be flawed in e-learning at this time. An MLE report from JISC reveals that although investment in e-learning had been made through the development of MLE and highlights the quality of teaching and learning and pedagogical innovation as the key drivers, it has not made any significant impact yet.

> 'Enhancing the quality of teaching and learning' is the key driver, identified by almost every institution, for MLE development. However, the reality appears to be that the student experience is being enhanced through improved delivery of teaching materials and course announcements, improved access to learning resources and better communication. Pedagogical issues are not (yet) a part of this, and, indeed, appear to have been of secondary concern until now.[21]
>
> Managed Learning Environment Activity in Further and Higher Education in the UK, JISC / UCISA report (2003, p.45)

[21] See: http://www.jisc.ac.uk/uploaded_documents/mle-study-final-report.pdf

Issues concerning pedagogy have recently been mentioned in academic environments, and in projects relating to e-learning in particular. There are concerns about technology-driven pedagogy from e-learning, online learning, and the like and what we should do from transforming traditional learning to online courses and Virtual Learning Environment (VLE). Many projects that supported e-learning had slowly shifted from technology to learning content, for example Reusable Learning Object (RLOs), learning resource development, online learning materials, and focus on specific elements in an e-learning context. It had led academic communities to a pedagogical focus after technological infrastructure was in place and satisfied them to a certain extent. Shifting the focus to learning has helped academic people reflect what they actually knew about learning, assessment, and learning outcomes.

Assessment is another concern in VLE. In the Minerva case, despite implementing VLE successfully across the University in three years, they revealed that assessing learning quality and outcome was not easy. In the first place, they wanted concrete evidence to prove the success of this new teaching and learning innovation. Measuring effectiveness in terms of the time spent on administrative work of the learning process was first highlighted. For instance, students could submit the assignments online without physically being on campus. Flexibility in terms of place had been increased, for example, students could access learning courses from fieldwork or from home. In addition, this innovation had helped make students more active and more engaged in the learning process than what had happened in a traditional learning method. A number of students participating in e-discussion boards, or asking questions between student-students or student-tutors was evident and could ascertain this point. Since the learning and teaching in VLE have changed from traditional learning and teaching, the method of assessment should also be updated and made applicable to the new learning and teaching style. Issues regarding e-assessment were addressed, and discussion continued to refine an appropriate method.

3.10. Learning Design and Pedagogical Approach

Having explored results from the two case studies, it appears that the learning and teaching process, as well as learning outcomes, were mentioned less when they talked

about introducing and implementing VLEs to their departments and universities. The focus of implementing VLEs falls on introducing a new technology and how to manage the technology well in educational context. Benefits, during that time, were on increasing flexibility in terms of time and place; increasing efficiency by reducing administrative workload and processing time in some procedures; and increasing learning activities to make students more active and engaged in the learning process. They rarely mentioned learning models, learning design, or the learning process when using VLE. When asked about measuring learning outcomes in this new learning environment, such as VLE, the interviewee stated that it was too early to measure it at this stage. During that time, VLE was seen as positive and looked very promising because it was good, beneficial, and worth trying if they wanted to keep abreast, be in the forefront, and perhaps hold their position in a competitive environment.

It is obvious that e-learning has been dominated by VLE for sometime, and that the first generation of VLE had a rather technological focus, which struggled to get users to overcome technological barriers. It seems that the focus has now slightly shifted to pedagogy (Browne and Jenkins 2003). Having educational related components developed and embedded in the e-learning platforms had provided flexibility to support learning design and gave control to users to transform their learning design to the e-learning environment rather than vice versa.

> … one major reason why the predominant pattern of use VLEs is for the basic course management tasks mentioned above and consequently why there has been little pedagogical innovation using these tools to date is that the first generation VLEs do not obviously support more radical or diverse learning activities. If the design of the software environment encourages a pattern of use that mimics traditional lecturer-student roles there is little incentive for lecturers to adopt new approaches.
>
> (Britain and Liber 2004, p.4)

The significant change that should be mentioned here is the development of Educational Modelling Language (EML) by Rob Koper and his colleagues at the Open University in Netherlands (OUNL). They proposed a new language to explicitly

model the interactions involved in a given teaching and learning situation so that this could be incorporated into the design of the learning activity. Although the development of the EML had not continued, it has played an important role in the development of IMS Learning Design Specifications.

> The primary aim of the learning design specification is to allow teachers or designers to describe a learning design in a standardised way that means it could be 'run' in a variety of learning-design aware players or environments.
>
> (Britain and Liber 2004, p.8)

However, there was no environment like that yet, and the learning design tool was scarcely found embedded in the e-learning environment. The development of Learning Activity Management System (LAMS) developed by Macquarie University in Sydney, Australia, aims to bridge this gap. Just recently, it was officially announced that LAMS was to be Open Source Software under GPL license.

> LAMS is a revolutionary new tool for designing, managing and delivering online collaborative learning activities. It provides teachers with a highly intuitive visual authoring environment for creating sequences of learning activities. These activities can include a range of individual tasks, small group work, and whole class activities based on both content and collaboration.[22]

Despite the similarity of learning design and lesson plans in education, it appears that learning design has been absent from e-learning. Just recently, it was readdressed by Professor Diane Laurillard, and inspired the LAMS project to develop this tool to embed in the e-learning framework.

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[22] See: http://www.lamsfoundation.org/

3.11. How Academics Adopt VLE: Involvement of 1st Generation VLE, and Development Afterward

Results from the UCISA survey (2001, 2003) illustrate that almost half of the academic institutions in the surveys had 1-4 VLEs on their institution system in 2001, and had increased to 1-6 VLEs in 2003. Interestingly, the number of institutions having 1-2 VLES has been increasing. This could ascertain that VLEs were a relatively new development, and could become mature in most institutions within a few years.

When looking at which VLEs that an institution had employed, WebCT dominated and stayed in the top rank in 2001, but lost its position to Blackboard in 2003. Additionally, the survey results clearly show that the range of VLE used in 2003 was expanding from 8 to 14 systems. Among those, Open Source VLE had been employed.

There was a criticism that the first generation of commercial VLE had lacked flexibility to adapt to different teaching and learning situations found in higher education (HE). Adopting a single VLE across the institution seemed insufficient, since demands of individual departments to produce learning modules could be varied. This was evident by the survey results regarding increasing in-house development of VLE from 11.3% in 2001 to be 22.7% in 2003. This can help address the issue that VLE requires high flexibility in design and that the system should be highly customisable. It seems that e-learning is not a cost saver as had been expected at the beginning.

Regarding reasons to use VLE, the survey reported some changes appearing since 2001. Using VLE to enhance teaching and learning has increased from 43% in 2001 to be 65.9% in 2003, while reasons to use VLE for efficiency and flexibility have declined. It may be inferred that academic people have become realistic and have passed an early stage of e-learning development. Astonishingly, distance learning was not mentioned anymore in 2003. Rather, other reasons related to technology-driven and marketing demand were pointed out, for example competitive edge, student demand, funding issues, and advanced technology. However, using VLE to support access and to widen participation was addressed.

In terms of limitations of VLE modules or features, it appears that in the first generation of VLE, technical persons took control of this new learning environment, rather than teachers or course designers. As such, institutions that had insufficient technical support to accommodate the course development team anticipated subsequent problems that might arise. Results from the survey revealed that supporting staff to use VLE mainly came from Central IT, the Learning Technology Support Unit, and Educational Development Unit. However, it was clear a few years afterward that new roles and new units to support e-learning were established in academic institutions, and new staff had been employed to support the learning teaching support unit and learning technology support unit.

3.12. Can change be planned? Planned Change VS. Emergent Change

Issues about 'continuous change' have also emerged in the process although Bennis, Benne, et al. (1976) explained in an early part of their book in "The Planning Change" that they intend to focus on elements of change that can be planned, and exclude 'continuous change' from their focus. However, in this study, it is an unavoidable situation. Technological change has always embedded an uncertainty in itself and becomes even more dynamic. In some respects, we have to admit that we are dealing with continuous change, and some parts of change cannot be planned. Evidence from these two cases can ascertain this point. Implementing VLE is a good example in this case. The VLE software that they implemented is not a static object and continues to change during the process of the implementation. The software itself had been modified and adjusted to serve users' requirements, which are always changing. I will discuss the dynamic of VLE in the following chapter and will elaborate on details of change and the impact that occurred.

What these two cases suggested to me is that it is advisable to clarify in an early stage those elements of change can be planned and managed and those which cannot. This is better than making an assumption that everything can be planned. Flexibility of the strategic plan, operational plan, and revisiting the plans regularly to make some adjustments would also help organisations respond to any unplanned factors quickly and appropriately.

3.13. Bridging gaps in theoretical framework

In Chapter 4, I explained the change process, approaching change, innovation development process, and I brought in many related theories about innovation and change from other disciplines, such as those from a technology, information systems, communication, sociology, and management, in order to combine those with innovation theories in education.

Somebody may question why theories of managing change appear less in studies about change in education. Mostly those theories are seen in business organisations rather than in academic environments. There were arguments that the business model may not fit appropriately into an academic context, and that they were entirely different. However, frequently we find that many business models have been employed in academic institutions. We, therefore, should not totally reject business concepts. Rather we should learn to understand which parts are appropriate, which parts are not, and which parts should be employed to benefit academic institutions.

3.14. Future Direction

Implementing and using e-learning in academic institution has now become popular. VLE usually comes along as a tool for e-learning. It appears that the landscape of e-learning has recently been changed, and will continue to change to support change of the user requirements. A concept of MLE, integrating VLE within MIS, is now in progress, and still has a long way to go. Sharing information with other applications has been involved not only on technological side, but also with learning content. Developing standards and interoperability specifications in both areas – content and administration, including the technical side – is a complicated process. Although it may not relate to teachers or learners in terms of using content, it is a fundamental structure to link with other systems, and sharing information can now happen.

Recently, the Joint Information System Committee[23] (JISC) has developed an e-learning programme to identify how e-learning approaches might be used to facilitate learning and to advise on how these approaches might be effectively implemented.

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[23] JISC is funded by UK Further and Higher Education Funding Councils and aims to provide strategic guidance, advice, and opportunities to use ICT to support teaching, learning, research, and administration.

One of the four areas that the e-learning programmes focus on is the e-learning technical framework, and tools for e-learning. As stated, integrating e-learning components with other existing systems requires much effort and cost.

However, to make sharing information in e-learning happen, developing standards and interoperability specifications has been established, and is now being led by IMS Global Learning Consortium. The standards here are not in place yet, and different working groups still carry on the discussion. It is hoped that if the standards are in place, the search facility will perform more efficiently than what we currently have, and records can be exchanged among institutions seamlessly.

Concerning flexibility of the technical framework of the institution, it appears that e-learning will require other related components to be embedded in the framework in the near future. It means that the system architecture needs to be open sufficiently to have these components. The development of Open Knowledge Initiative (OKI) from MIT aims to contribute to this point. The project intends to produce an open and extensible architecture in which e-learning components can be embedded and can communicate with each other and external enterprise software. Although it is still in an early stage of the development, it has the potential to be useful in the future.

3.15. Summary

In this chapter, I have explored the development process of VLE, and it is clear that VLE has changed from the 1st to the 2nd generation, and from a technological to pedagogical focus. User perception of the VLE, which has been blurred by technology, has now changed to be more pedagogical perception. Their needs to use e-learning have been provoked, and users have begun to adjust their expectations and become more realistic.

As VLE represents an innovative object that has been introduced to an academic institution, results from the two case studies have illustrated that an initial stage of the development process of each type of VLE is different. Participation in the design and development process has increased a sense of ownership, and hence can reduce resistance to change and can increase the adoption rate. This seems to be an advantage in choosing an in-house development VLE. However, using commercial

software may exclude this stage, but it can shorten the development process and workloads of institutional technical staff.

It is clear that VLE is dynamic. The development never stops, and user requirements have also continued to change. The requirement to share information with other VLEs and to make VLE compatible with other applications in MIS has led academic people to develop interoperability standards. In the context of VLE, standard and interoperability are concerned with two areas: content and administration.

Importantly, implementing VLE requires a multi-disciplinary team to help in developing and maintaining the system. Having only teachers or technical staff on the team does not suffice. Additionally, it requires policy support and a sufficient budget to make the system run smoothly.

However, introducing VLE to academic institution is a long process. Selecting the VLE and putting it on the institution system is merely the first step in the process; how to use VLE efficiently is another. Implementing a VLE that looks at the technological side, and only slightly covers learning content, occurred while VLEs were in the 1st generation. Obviously, technological infrastructure needs to be in place before delivering learning content, though the content can be prepared in advance before the technology has settled.

Shifting the focus of the VLE from technology to pedagogy does not mean that technology is an illusion, and learning and teaching should be our only concern. Despite technology leading users away from the pedagogical track, it should be remembered that e-learning was developed within a technological framework. Technology is a vital element in the e-learning framework. Developing technology along other elements and using it wisely should be a key to the success.

In the following chapter, I shall go back to the Faculty of Nursing at Mahidol University in Thailand, and shall explore how to introduce innovation to the Faculty. Results from the main study, as illustrated in Chapter 7, will help inform me of an appropriate approach that should be employed, and which will serve user requirements.

Chapter 8: Back to Reality: Revisiting the Faculty of Nursing at Mahidol University in Thailand

1. Introduction

I discussed the Faculty of Nursing at Mahidol University in Thailand in the pilot study and explored the Faculty situation and direction at that time. That enabled me to explore the Faculty needs and specific requirements; identify stakeholders that were influential and involved in the context; and clarify drives that led the Faculty towards e-learning, including its existing situation. Thereafter, in the main phase, two case studies in the UK and the Netherlands had been conducted in order to develop a conceptual model of how e-learning had been implemented at the institutions in these two countries. The conceptual model has been revised repeatedly, and now begins to take shape.

This chapter will illustrate the final phase of the study, my second visit to the Faculty. The purposes of this visit were to explore changes that had been happening since the pilot study in 1999. This could bring in the conceptual model from the main phase to probe whether the model could be appropriate to the Faculty context, which parts were missed, and what should be revised and why. Face-to-face interviews had been conducted with administrators of the Faculty, the heads of departments, the academic staff, and the staff in the IT unit. Details are summarised in Table 8.1. This includes a list of informal discussions that happened during the data collection process, as well as observation notes and related documents.

As identified in Table 8.1, three administrators of the Faculty, who were involved in developing strategic plans and managing the nursing curriculum, had agreed to have a face-to-face interview. An appointment had been made to have an interview with the Dean of the Faculty, but due to her unavailability, I could have only an informal conversation with her in front of her office. Unlike the other two interviews, the conversation was written as a fieldnote. Some points from the conversation are worth mentioning and including in the analysis part.

Table 8-1: List of interviewees in the final phase of the study at the Faculty of Nursing, Mahidol University, Thailand

Face-to-Face Interviews & Observation Notes	
1. Dean of the Faculty (*observation note only*)	Executive level
2. Associated Dean in Planning and Strategic Development	Executive level
3. Associate Dean in Curriculum Management	Executive level
4. Head of the Department of Fundamental Nursing	Executive/Departmental level
5. Head of the Learning Resource Centre (Skilled Laboratory)	Executive/Departmental level
6. A lecturer who was involved in proposing a project in distance learning	Academic staff, Faculty member
7. Staff in IT Unit – two lecturers, and two technical assistants	IT staff
Informal Discussions	
1. Vice-President for Academic Infrastructures Development & Director of Mahidol Computing Centre (MUCC)	University level
2. Two registered nurses at the Siriraj Hospital, Faculty of Medicine (Siriraj), Mahidol University.	Hospital/Clinical context
3. Two academic staff at the Faculty of Nursing, Mahidol University	Academic staff, Faculty member
Observation notes	
Documents	

Two other heads of departments had also been interviewed; one was the Head of the Learning Resource Centre (Skilled Laboratory); and another was the Head of the Department of Fundamental Nursing. Both of them held positions in the executive committee, and also acted as head of their department, hence could provide information at the departmental level as well as understanding the strategic direction of the Faculty. One academic staff that had been involved in proposing a Distance Learning Project of the Faculty was also chosen to interview. Another important perspective that should be included was from the IT staff of the Faculty, who were involved directly in implementing technological change in this context. This included a group interview of the IT staff, which was meant to reflect a view of the academic staff about IT, the current situation of the Faculty, and possibly to illustrate a flaw in the Faculty from different perspectives than those of management or senior executives.

During this time, as well as conducting a formal interview, I also had an informal discussion with the Vice-President for Academic Infrastructures Development,

Mahidol University, when we met in an academic conference. He had responsibility for developing and leading the IT strategic plan of the university. The discussion gave me an opportunity to explore the vision and policies of the university intended to support academic staff and students in making use of IT.

Another informal discussion with registered nurses at the Siriraj Hospital had also been included in the analysis. This meant to explore the situation in a clinical context, what had been happening to the nursing students in clinical practice, and perhaps what would affect them after graduation.

During the data collection process, observation notes and a research diary had been recorded and used as sources of evidence, together with related documents, such as the Faculty annual reports (1999), Quality Assurance of the Faculty 1999, IT-Master Plan (2001), and the like. As Coffey and Atkinson (1996) state, qualitative data occur in a variety of forms, and there is no single way of approaching those materials.

2. Changing My Lens

After accomplishing a critical data analysis of the two cases in the main phase of my research, I began to understand e-learning in a wider context. In my perspective, this comprises multiple components inside, with vertical and horizontal relationships that are associated with organisations and other external entities. As a result, revisiting the Faculty this time was not the same as the first time when I did the pilot study. Unlike collecting data for the case studies in the western countries, I came back to my institution, using my own language and talking to my colleagues, particularly the IT-team, but now with a different view and perception. The analysis that had occupied me, along with a geographical distance that had detached me from the Faculty for some time, had gradually turned me into an "outsider" in my own institution and a stranger in a way. Thus, I did not see the Faculty as I saw it when conducting the pilot study in 1998. Although I was welcomed by my colleagues as they normally would, I now looked at things differently. Many things had changed considerably since the last time I had left.

I have employed here a concept of participatory research to underline that researcher and researched are inseparable (Freire 1970; Finn 1994; Sohng 1995). Indeed, he/she has brought a background, experiences, and knowledge as part of the research to help in interpreting the content and to be the foundation of understanding. Both researcher and participants are actors in the investigative process. As an academic staff that had been working there for years, I did understand the background of the Faculty well, and spent a little time to confirm an internal communication flow. Understanding the communication flow helped me identify the point of contact and whom I should approach for interview. However, I did not employ only a formal interview in the data collection process. With the IT staff, we had a group interview once, and more often we had informal discussions, as a group and as individuals. Unlike a formal interview, the *dialogue* gave them an opportunity to talk to each other, sometimes reveal their personal issues, and led them to shared meaning. It was a self-reflective process in a way.

> The dialogic approach differs from conventional 'interviewing' in several respects. Interviewing presupposes the primacy of the researcher's frame of reference. It offers a one-way flow of information that leaves the researched in the same position after having shared knowledge, ignoring the self-reflective process that the imparting of information involves. (Sohng 1995, p.6)

I was asked to share my perceptions, be a 'critical friend', and sometimes give them advice. It was not only that they learned from me, I also learned from them. From a participatory research point of view, knowledge production is a dynamic process of "engagement, education, communication, action and reflection" (Finn 1994:27). The development of this conceptualising knowledge is an emergent process. It gradually moves research process in the direction of participation and partnership (Sohng 1995:5).

When I first conducted the pilot study, I was new to the context of e-learning. I understood the importance of technology and how beneficial it could be when integrated into teaching and learning. However, when I looked back on it, that

understanding seemed to be shallow. Data collection and data analysis of the main phase brought me a new lens to look at e-learning. During that time, although the situation had changed considerably between the pilot study and the final phase of my research, the distance that occurred had turned me into an outside observer, and gave me new lens of awareness of the issues that came after the main phase analysis. This helped me identify the black holes in the Faculty – the black holes of perception.

3. Bureaucratic Reform

3.1. Changes at the National Level

A remarkable event in the history of Thai Education was an establishment of the National Education Act 1999 (ONEC 1999). The National Education Plan had indicated that IT was recognised as a strategic weapon that would lead the country towards international collaboration and recognition. Indeed, it is evident as an essential skill to enhance employability and recognised as a vehicle to support teaching and learning. However, at the time it was obvious that the technological infrastructure of the nation was not in place yet. To steel up this development, the government had proposed a new structure, and established a new Ministry in 2003, the Ministry of ICT, to take responsibility for this issue.

The government policies to reform the system, including IT, had brought a great change to the country. The most remarkable event was the first National IT Master Plan, IT2000, that was announced in 1996 (Office of the Education Council 2004).

> In February 1996, the first National IT Policy, called IT2000, was announced by the NITC[24] (National IT Committee) and endorsed by the Cabinet. IT2000 put forward the vision for the country to properly exploit IT to achieve economic prosperity and social equity. To this end, the policy emphasized three common development agendas, i.e.,

[24] The Thai Government started this initiative project in 1992, to set up the National IT Committee, or NITC, which is a high-level policy body chaired by the Prime Minister.

- to build an equitable national information infrastructure (NII),
- to invest in people to accelerate the supply of IT manpower and to develop an IT-literate workforce, and
- to achieve good governance

(Thuvasethakuland Koanantakool 2002)

This, in fact, had a direct impact on education nationally from primary schools to higher education. Having a clear direction of the IT infrastructure had provoked numerous changes in the government and business sectors. Educational institutions at every level had received extra funding to purchase new technical equipment to support in teaching and learning, including related hardware to support network connection internally and externally. The SchoolNet and Uni-Net projects were established and had 4,300 schools connected to the Internet in 2002 (see Table 8-2). It was expected to connect 36,000 schools throughout the country to the Internet when the project was completed in 2005.

A breakthrough of telecommunication technology occurred when high-speed broadband connection was introduced to home users and small businesses at an affordable price. This had made a great change in Thai society. Accessing the sources of information became easier. Users were encouraged to exploit new ways of communication. This change also applied to academic staff and students. It has created a new wave of communication and proposed a new direction of how technology can enhance teaching and learning in an academic environment. On top of that, it has raised awareness in academic people that technology is unavoidable. It is not only a matter of having them stays abreast, but also an enforcement of the national and university policies to have them step forward with new skills.

The development of an IT-Infrastructure nationally has reflected an expansion of technology in terms of adoption rates and increasing accessibility and equality (Thuvasethakul and Koanantakool 2002). It applies to other pertinent issues that would come along afterward. In addition, when having a clear direction of the

government's short-term and long-term investment, it helps academic institutions to develop strategic plans in an appropriate direction (Faculty of Nursing 1999).

Table 8-2: Timeline of IT and Education Development at the National Level

Time (year)	List of Important Events
October 1997	- **Constitution** The Constitution greatly increased the right of Thai citizens to political participation ensuring the rights to voice opinions on major topics. It was the first time that Thai people throughout the country were invited to participate in discussions contributing to decision-making on the National Education direction.
August 1999	Launching of the **National Education Act 1999**
2000	- The first **National IT Policy** was announced by the NITC (National IT Committee) and endorsed by Cabinet. - **Bureaucratic reform**. The merger of three agencies formerly responsible for educational services, namely the Ministry of Education, the Ministry of University Affairs, and the Office of the Education Commission. These agencies have now been reorganised into a single Ministry of Education (MOE).
2002	- **Amendments of the National Education Act** - **SchoolNet Thailand** in place. The project under MOENET has connected 4,300 schools to the internet. It will be completed in 2005 and is expected to connect 36,000 schools across the country to the Internet. **- Bureaucratic reform – Establishing of Ministry of ICT** **- Privatisation of the public universities** **- Participate in Asia e-learning Network (AEN)**[25]
2004	- Establishing of Special Interest Group in using **Open source VLE - Moodle**[26] - UNESCO – support open source software
2005	- **Open Source Software Policy** The Software Industry Promotion Agency (SIPA) has established a new department with specific responsibility for the promotion of open source. - Ministry of ICT – Purchasing new PCs with Linux software (pen source) to reduce initial cost. - Improvement of telecommunication technology in Thailand – Broadband connection for small business and home users at an affordable price.

[25] See: http://www.asia-elearning.net/index.html
[26] See: http://www.thaimoodle.net

Despite the policy-driven technical infrastructure nationally, activities of e-learning were established in many universities in Thailand. Results from a survey on e-learning in Asian countries – Fiscal year 2002[27] indicate that there are number of universities in Thailand that have implemented e-learning at their institutions with synchronous and asynchronous technology since 2000. Six universities in the top rank of the country were reported in the survey, but surprisingly excluded Mahidol University from the list. However, Mahidol University was named as a collaborative institution with Chulalongkorn University (Thailand) that had exchanged lectures electronically with Osaka University (Japan) in April 2002.

It should be noted here that a Virtual Learning Environment (VLE) system has also been employed in Thailand, but was visible in 2004 as a special interest group that used Moodle, an open source VLE. In Chapter 8, I mentioned the demand to have open source VLE as it provides an opportunity for academic institutions or any teachers who have self-interest in using VLE to experiment with their ideas. Employing Moodle in Thailand is an example that proves this point. There is no need to wait for institutions or schools to provide VLE on their systems; this long process can be bypassed now.

3.2. Changes at Mahidol University

Having developed the MUC-Net project in 1996, as described in Chapter 3, the project has been continued, and campuses were linked together (Mahidol University 1999). Concerning this network connection, users had complained that the campus network speed was very slow. However, this was improved during my visit in 2001 (Upsorn 01/02/2001; IT-Staff 05/01/2001; NS-Service 05/01/2001).

It seems the university had recognised the importance of IT more than before (Mahidol University 1999), and had allocated a higher annual budget to this area. The Director of the Mahidol University Computing Centre (MUCC) was appointed to be Vice-President for Academic Infrastructures Development. An IT-course, 'Introduction to Computers', was proposed to be a compulsory subject for students in

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[27] See: http://www.asia-elearning.net/content/relatedInfo/report/elearning-trend-2002-thailand.pdf

undergraduate programmes. The MUCC also provided IT-training courses for students and staff throughout the year (Mahidol University 1999). This is perhaps due to an expansion of the university in establishing new regional campuses in the north and northeast of Thailand (Mahidol University 1999). The administration was hoping that technology could ease the situation in this regard.

Due to the limited capacity of the MUCC, schools, institutions, and faculties within the university had been asked to develop an internal IT support team individually. It can be seen as a way to decentralise the system and help those faculties become mature independently. However, an impact from this policy may hinder the development process of some faculties, since each faculty had different capacities and grew at different rates.

3.3. Changes at the Faculty

Increasing IT Awareness

In this second visit, it was obvious to me that the Faculty had changed considerably in terms of increasing the quantity of technical equipment for the faculty staff, academic staff, and students. The ratio of staff per personal computer (PC) had been reduced from 7:1 to be 4:1, and leading towards 1:1 soon after (Saichol 10/01/2001).

It should be mentioned here that the Faculty had taken seriously the goal of developing the IT system. This was highlighted in the Higher Education Development Plan Phase 8 of the Faculty (1997-2001) and became a new project in the plan to support administrative purposes (Faculty of Nursing 1997). Another project in the plan was to support library services and educational technology of the Faculty. This aimed towards enhancing the quality of education that the Faculty provided (Faculty of Nursing 1997). Plan Phase 9 (2002-2005), had discussed proposing a "Nursing Informatics" as a new Specialty Training Programme of the Faculty. This would be expanded to include a Master Degree Programme thereafter.

The IT Unit of the Faculty had arranged IT-training courses to support academic and faculty staff exploiting IT to enhance their work (Faculty of Nursing 1999). It should be noted that the IT-skill of the academic staff had been improved substantially (Faculty of Nursing 1999). Instead of using transparencies, a number of academic staff were using computer presentations in lectures (IT-Staff 05/01/2001; NS-Service 05/01/2001; Sunee 18/01/2001).

> " …We (the Department of Fundamental Nursing) had arranged a 'PowerPoint presentation training course' for our staff. Actually we taught each other how to use it… it seemed to work well … they liked it. But more often, our staff don't have projectors to present their PowerPoint slides! They have to print it out instead. Still, we don't have a laser printer yet… How come we print this on dot matrix? As you know, we don't have sufficient equipment. …"
>
> (Sunee 18/01/2001)

Although this seems to transform the learning materials into digital format without changing the method of teaching, at least, at this stage students were able to reprint or distribute lecture notes conveniently. It seems to be an initial state for them in overcoming technical barriers. However, preparing staff to be ready, with insufficient facilities to support them is rather discouraging. Perhaps this could be a drive for the Faculty to have the technical infrastructure in place as soon as possible before moving to a production stage.

Proposing a Distance Learning Project

The Faculty IT-master plan, as guidance for future development, was developed to comply with the IT-master plan of the university and to support the strategic plan of the Faculty. The Dean of the Faculty, in her speech to the academic staff preparing for the Quality Assurance Examination, had mentioned that a Distance Learning Project was planning to launch in a few years. I found very little had been mentioned about this project in the IT-master plan. When I first came back to the Faculty, I was asked to join the project meeting once.

"…I asked in the meeting what they meant by distance learning, and I was told that it was a study on the Internet. It could be either synchronous or asynchronous mode, but would use studio to develop and broadcast as a videoconference to audiences…."

[Field note, 05/01/2001]

"…So, the meeting was about estimating the amount of funding – a preparation for buying new hardware, but excluding staff time."

[Field note, 05/01/2001]

It seems to me that this project would enormously increase the workload of the IT-staff. Perhaps the limited capacity of the IT-unit has not been clarified. It was not just an unclear definition of what they were going to do, but also a lack of clarifying their capacity of what they could do within their own limitations.

Embedding IT in the Nursing Curriculum

Results from a study reviewing the nursing curriculum in 1996 (Wichiencharoen 1996) indicate that nursing institutions should pay more attention to subjects, such as sciences and technology, as well as ethics. These subjects should be integrated into compulsory subjects rather than treated as individual optional modules. The study also illustrated that a few nursing schools in Thailand had integrated an IT course as a compulsory subject into their curriculum. Indeed, some nursing institutions also provided an instructional technology course as an optional subject for students.

Considering having the course 'Introduction to computers' as a compulsory subject, the Faculty devised it for undergraduate students in years 1 and 2 (IT-Staff 05/01/2001). The MUCC had taken responsibility for this course across the university. The Faculty held responsibility for another IT-related course, 'Nursing Informatics' that launched in 1999 as an optional subject for nursing students in the undergraduate programme years 3 and 4 (Ratchada 21/02/2001). It appears that IT-skill and IT-knowledge had been exploited in specific subjects that related to IT, but not across the curriculum yet.

In terms of 'Nursing Informatics' course, students were expected to have IT-skills, a fundamental concept about IT that related to nursing, and should be able to apply their IT knowledge to facilitate their work where appropriate.

> "… Having an informal conversation with two nurses who worked in clinical area, it appeared that [the] hospital information system was not in place yet. Besides, it was a ward clerk who used computer to do her job, not nurse!"
>
> (NS-Service 05/01/2001)

It appears that the Faculty had provided the required skills to students for clinical practice, but it turned out that the situation was not ready to make use of those skills. It should be noted here that this also happened to the students in Primrose case.

Introducing a new teaching method: What happened to PBL?

In terms of a new teaching method, Problem-Based Learning (PBL) was a good example. It had been introduced to the Faculty for years (Faculty of Nursing 1999; Nursing Council 2000). The faculty had also arranged a group of senior staff a visiting trip to McMaster University in Canada (Faculty of Nursing 1999). This aimed to give them a better understanding of how to exploit the new teaching method and steer it towards the faculty curriculum. However, after implementation, more than half the academic staff had begun to complain about this method.

> "…Our PBL is still…similar to lecture in a small room!
>
> …Yes, that was reported in evaluation. But nothing has been changed….
>
> …Evaluation? … it came out on both negative and positive sides. Some group said it was good. Students had a chance to learn. But some said student learning in each group was not the same, and not equal, perhaps.
>
> …No computer involving in the PBL yet. Learning resources mostly come from books in the library"
>
> (Saichol 10/01/2001)

"...Looks like it was abandoned in the Department of Obstetrics Gynaecology now. They thought it wasn't appropriate for their students. Should this reflect how we employ PBL? Have we managed it appropriately? PBL is not a lecture. How come people turn PBL to be a lecture? Can you imagine that?"

(Nattanee 23/01/2001)

They mentioned that students had not been prepared to learn this way. Students did not know how to be active in the classroom, no inquiry skills, and there was a lack of self-assertiveness. Results from a quantitative study conducted by a group of academic staff of the Faculty compared using PBL with a lecture indicate that students still preferred the lecture (Kaikao and Chanpong 1998). It was probably because they were treated to passive learning for years (Nattanee 23/01/2001). Furthermore, essential skills to acquire new knowledge, such as searching skills, were less developed. In fact, an environment to support this method had not been fully prepared, learning resources appeared to be insufficient and are not accessible, and learning facilities were not fully equipped to support students in this new direction (Nattanee 23/01/2001).

> "...we still have many weak points in PBL. The basic concept of PBL in fact relates to a concept of student-centre. The Faculty has encouraged our academic staff to visit other nursing institutions abroad, and had attempted to develop 'Resource Centre' to support student learning in this regard. But, fundamentally we are not firm yet. We would like students to acquire knowledge by themselves, but we don't have sufficient resources to provide, i.e. technology, or something [as simple] as books.
>
> ...An obvious example was my direct experience this morning when I attended PBL class as an observer. There were three groups of students, and ten books as learning material. The first group borrowed all ten from the library, and left nothing for the other two groups. Nobody came to manage this for them. This

> does not really concern IT, but a point here is we haven't [taken] this into account and haven't discussed it seriously yet. It doesn't reflect merely that we either have insufficient learning resources, [or a] lack of budget to buy them more. Instead, sharing culture has not been established…
>
> *(Nattanee 23/01/2001)*

The point 'sharing culture' should be echoed here. This is not merely the Faculty, but also appears in academic environments elsewhere.

> …In terms of tips and strategies to conduct PBL, we have loads of things to learn and develop further. …We have to accept that nurse has not been trained to be teacher, thus, not familiar with teaching learning strategies….
>
> …I had this when I attended class in Australia. My teacher over there mentioned that 'method of lecture should be changed… It doesn't help student[s] in cognitive learning.' This teacher was awarded as a best teacher. His teaching had made class enjoyable, and students were encouraged to talk… a lot more… He mentioned to me that 'you should keep in mind that there is no way to teach and finish a large amount of content in a thick textbook within 2 hrs. You must teach students to learn by themselves. Do whatever you can to get them [to] love…love to go out and acquire knowledge. This is the heart of teaching!' And I think this is the point that we don't have here. We force feed students…and feed them…as much as possible [by lecture]. But now, it doesn't work like that anymore. Students are capable to learn and could do it by themselves if we teach them how to learn and acquire new knowledge. I believe in this. I think some academic staff here has now begun to go down that route, but as you know, a little positive response came out, but more to discourage them in a way. Perhaps PBL would be a way forward, though many are still against it."
>
> (Nattanee 23/01/2001)

Understanding the concept of teaching and learning is an issue here. Indeed, it is 'praxis' (Freire 1970; Finn 1994) - transferring concept into practice – that is becoming more complicated.

Concerning insufficient learning materials to support students' learning, the university as well as the Faculty has considered this point. The university has allocated small grants to articulate academic interest. However, due to heavy workloads, the academic staff has exceeded their capacity to produce these on their own (Upsorn 01/02/2001; IT-Staff 05/01/2001). There was no support team to handle these for them.

Having discussed this with the Director of MUCC/ Vice-President for Academic Infrastructures Development, the point was clearly ascertained. He explained that although the university had provided grants to support academic staff in producing learning materials, the project had failed to achieve the target. The staff could not deliver outcomes on time after the projects were over.

> The staff would like to return the money, but that is not the point. We would like to have the end products.
>
> ...It is clear that they could not do this by themselves. They need teams with multiple skills and talent. You can't find all of these in one person. Even so, that person still needs time to produce materials. It is impossible for him/her to always do that by spending extra-time and gain[ing] nothing…
>
> (SPC 20/02/2001)

This indicates that the process of developing learning materials has not been clarified. It is unlikely that the educator who is a content expert will hold other roles of the team members or acquire multiple skills quickly. Thus, it does not surprise me that the project mentioned above had failed to deliver the needed outcomes.

To stress this point, a process of developing learning and teaching materials, I shall refer to my experiences working with and involving a National Funding Project in Higher Education in the UK while conducting this study. I was appointed to be a steering member of a PBL funding project named, 'Students On-line in Nursing Integrated Curricula (SONIC)', based at University of Central Lancashire[28], UK. The project was funded by the Fund for the Development of Teaching and Learning (FDTL) Phase 4 Project. It had developed web-based resources to support PBL, and five scenarios with flash animations had been produced, including facilitator's notes.

In contrast with the small grant that the Mahidol University provided for academic staff to produce learning materials, the FDTL4 project has illustrated clearly that developing learning materials requires a large investment, multiple skills, and expertise to work as a team. Just putting the content on the website, or converting it to an electronic format does not change much for learners. Despite having a pedagogical concept, producing learning materials requires a large investment in terms of time and budget. The SONIC project has demonstrated that collaboration and sharing can help reduce production costs and increase the quality of the outcome. Purchasing an outsourcing material could be an alternative, but is not appropriate in this regard, since the Faculty had limited budgets to spend on software licenses (Faculty of Nursing 1999).

IT Unit: Unpromising direction

IT Unit vs. Academic Support Centre - In response to MUCC-Net project in 1996, the IT unit was developed (Faculty of Nursing 2001) with unclear management structure of what it would be in the future. In regard to the National ICT policy, the university, including the Faculty, had to conform to the direction and had employed a number of academic staff to fill this unit. Apparently the unit was barely in line with the organisational structure of the faculty at that time. Although changing and re-arranging the organisational structure had formerly been considered (Faculty of Nursing 1999; Charoenyooth, Tilokskulchai et al. 2001), it required much effort and

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[28] SONIC is a FDTL4 project, developed by a consortium of four Higher Education Institutions. See: http://www.uclan.ac.uk/facs/health/nursing/sonic/

took time to proceed. The official documents had to be proposed to the university council/committee for approval, and that could be years before it could be delivered. During the transition period, the academic staff that had been working in the unit had to confront an uncertain situation. The threat of university privatisation had made the situation even worse. As the academic staff in the IT unit, they were convinced that their roles and the actual job that they handled were more appropriate in an academic support position rather than in an academic staff position (IT-Staff 05/01/2001). Having an academic position required focusing on academic not technical work. Currently one academic staff member in the IT Unit has held a position as a lecturer in the Department of Fundamental Nursing, while the actual job responsibility is to manage IT system of the Faculty. There was a comment from the Faculty administrator that mentioned:

> This job is supposed to be a technician's job, not for academic staff.
>
> (SPC 20/02/2001)

The IT staff perspective is full of frustration and uncertainty about their positions:

> [In preparation to Quality Assurance Approval, two academic staff who worked in the IT Unit were asked to rewrite their job descriptions]
>
> "…I was asked to rewrite this. When I gave this to her (the Associate Dean), she gave it a glance and said 'I won't spend time on this! Your writing here is not the one that I expect. If you do like this (as stated in the writing), you have to go back to be a lecturer in your department!!…' You see, can you imagine how I felt? I was stunned…and speechless… she then continued stressing, 'this is not! This is a job description for teaching! But you're not. Just write what you do at your unit, don't you understand? You do database! That's your job!!'…
>
> She thought IT was Database, you see. I just don't know what to say (long sigh…). She didn't understand or even care about us at all…
>
> (IT-Staff 05/01/2001)

There appears to be a strong sense of academic hierarchy here. People who were involved in IT were treated as 'technicians', not as prestigious as academic staff who held a teaching job. Additionally, there was a sense of seniority.

> …I wish we could have this IT Unit detached from any offices/ departments… and be more independent. And have a strong Head of the Unit who can protect us. But what has been happening is an unclear position of our unit. Who should we report to? It's a bit confusing to us… anybody can come and do anything to us, as if we are a public object! ... Anybody who has a power above these two (two academic staff in IT Unit) or is senior than them can put any command on this Unit, and take us to do any job, anywhere…
>
> (IT-Staff 05/01/2001)

These are part of and organisational culture that could be a barrier in developing teamwork at a later stage. At this point, it is obvious that an early stage of the development of the IT unit demands time and effort to establish technical flow and to ensure infrastructure is in place (IT-Staff 05/01/2001; Faculty of Nursing 1999). The requirements of the IT Unit were a blended demand. It combined work for administrative and academic purposes (see Figure 3-5). At the time, due to the rigidity of an expansion of the organisational structure, the Faculty was concerned that they would not be able to respond to this demand. Hence, the Faculty had attempted to negotiate with the MUCC by asking it to extend the services to cover at the faculty level, but it was in an unclear situation whether the University Computing Centre (MUCC) had planned to distribute the system, or there was lack of capacity and budgeting to centralise its service. It finally appeared that every Faculty had to arrange their own support unit. The MUCC could provide only advice and central network support that related to the university system, but not specific to the Faculty requirements (Mahidol University 1999).

The direction of the IT Unit seems unclear, and whether it should hold the position as a Learning Support Centre along with technical support and maintenance. Although it had begun with the requirement of having IT infrastructure, the demand has now

shifted slightly into being a teaching and learning support unit. The academic staff had begun to think about their own requirements and what they could achieve if employing IT. However, an unstable position of the academic staff in the IT Unit has now become a concern since this may reflect an inappropriate organisational structure that is unable to fit this unit into the Faculty context.

To encourage academic staff to employ technology in their institutions, aims and objectives of doing that should be clear in an early stage. It should be noted here that technology is very dynamic and always changing. It may drag us off track easily. It is often that we may find ourselves staying under the control of technology, rather than in charge of it and harnessing it.

4. What do we learn from this?

During this time, an impact of change from outside had begun to influence the Faculty plan, such as establishing new national policies particularly in an ICT national strategic plan, at nearly the same time as implementing national education reform and creating changes in higher education.

4.1. An Early Stage of the IT Development Process

Results from my final phase analysis ascertain that the Faculty was now in an early stage of the IT development process. Focus had been made on providing hardware and developing IT infrastructure for the Faculty staff and students, and to increase accessibility and flexibility in employing technology in the Faculty (Saichol 10/01/2001; Patama 20/02/2001). Change had begun on administrative work, with little visible in teaching and learning, though it was hoped that it would cover teaching and learning related issues thereafter.

What I mean about the early stage of the IT development process here is that the Faculty had just established a computer network system, and transformed their standalone personal computers (PC) to connect with the Internet. An Intranet system and mail-server were subsequently set up. Communication by email had just begun, but mostly with the outside, not for internal use. Email was not part of their daily routine work yet. It should be stressed here that not every academic staff had their

own PC; the computer network system had not been utilised as such. During this time, the Internet connection at the Faculty was still slow and not very stable. In part, this was because of the internal university network system, and in part, it was due to the slow connection speed of the Internet gateway out of the country (see appendix – Map of the Internet Connection in Thailand, 1999 and 2001). This has now been improved enormously.

Although technology was a concern in the early stage of developing e-learning, their starting points are different. The term 'IT' and 'technical infrastructure' seem to be a broad term that covers many development stages. In this case, IT began with the development of the network communication technology to form a base of the technological system and a backbone for electronic communication. It is a way to make computers talk and transfer data among each other in a digital form. A step afterward is to have applications running on a server or a local area network (LAN). This will be a time to explore, select, and install the appropriate applications to run on a system and to serve user requirements.

In case of Minerva, a network infrastructure was already in place. They came to the stage to explore an application like Virtual Learning Environment (VLE) to put on their system, (see details about VLE in Chapter 8). Similar was Primrose, although they had referred to the problem of technical infrastructure and the merging of the school with the university having had disrupted their network services, they began to recover, and the development had been continued after receiving technical support from the university.

However, in the case of the Faculty of Nursing (FoN) at Mahidol University, they had just finished implementing a network communication technology at the Faculty, and began to look for applications to put on their system. However, the network communication technology was, in fact, not really in place yet. Users still complained about the slow connection speed and the instability of the server system of the university. This problem is beyond the responsibility of the FoN. It is, in fact, an Internet backbone connection and gateway to the country that has a limited capacity. This problem has gradually been changed, and the connection speed has been doubling in the last few years (see appendix D)

The situation of the Faculty is not unusual. Implementing technological change has begun with developing the IT infrastructure, as happened in the Minerva and Primrose cases, and also elsewhere (Sinko and Lehtinen 1999), particularly in higher education institutions in the UK, (Jenkins, Browne et al. 2001; Wilson, Olivier et al. 2004), but how the infrastructure can support what the Faculty requires is another concern. It should also be remembered here that the two case studies in the main phase are the cases that had already implemented VLE on their systems, and exploited it in their learning-teaching courses. In the case of the Faculty of Nursing (FoN) at Mahidol University in Thailand, the academic staff has just begun to employ Office applications on PCs. They were new to VLE and other web-based applications. Despite the student enrolment system on PC-standalones, the Faculty had not developed any administrative system yet. Another learning-teaching related application that has been in the development process on and off for sometime, was an Item-Bank System. Having VLE on the Faculty servers, hence, would be something new to them. E-learning skills have to be taught, and some practical sessions are also required.

Although there are similarities in the stage of IT development process, such as selecting off-the-shelf products or having an in-house development system, some distinctions should be clarified here.

4.2. E-Learning: Technological-led, so where is the pedagogy?

It is obvious to me that an e-learning process always begins with implementing technology. In this context, however, I consider technology as something used to harness learning. I look at e-learning as an innovation that comprises two main layers: technology stays on the outer layer and learning on the inner layer. People mostly have overlooked the inner one, and thought of technology as the main focus. This is ascertained by Britain and Liber (2004):

> 'Much activity has been on MLE or portal development, which has often been more concerned with administrative aspects and improving student experience in a general sense than with teaching and learning. Instead of

> focusing on process review and organisational change to support eLearning, developing staff skills in the use of VLEs for innovation in teaching, developing local tools, applications and learning activities to meet specific learning needs – institutions have focused on ease of use, centralisation and integration with existing systems.
>
> (Britain and Liber 2004, p.8)

Concerning teaching and learning approaches, some points should be emphasized. What we can reflect on from the case of PBL at the Faculty of Nursing (FoN), Mahidol University in Thailand, is that the concept of teaching and learning cannot be transformed into practice easily. As described in section 4.3 of this chapter, the academic staff was new to this teaching method. Students were not just passive learners in a classroom anymore. However, lectures seem to be a popular teaching style that both teachers and students are accustomed to, and teachers could not keep themselves away. They require time to practice before integrating this new skill into their course. Since this stage was overlooked when the Faculty had implemented the change, it had left the academic staff frustrated and had finally led them to reject this method. The implementation would be unsuccessful.

It is beyond the scope of this study to probe how to implement PBL in the nursing curriculum at the FoN effectively, but we have learned from this that the academic staff requires training and an appropriate professional development plan. Changing only the concept without allowing time to practice will not make the change sustainable.

It is not just a matter of a new teaching style, but having PBL integrated successfully will require learning resources that are accessible, time to continue self-study and group discussion, and motivation/encouragement to support them to learn new skills. These are vital and are part of an implementation process. Putting an innovative idea into practice too early without good preparation could cause a high risk of failure. That means a large investment in terms of time and money would be wasted.

Regarding the technological-focus, changes in the IT unit at the FoN have also begun. An unclear position of the IT Unit in line with the organisational structure of the FoN was clearly visible. This obviously would not be resolved quickly, but rather require long-term planning and careful preparation from the FoN. Subsequently, an expansion of the IT Unit to be the IT Centre of the Faculty (FoN) had been proposed (Saichol 10/01/2001). This would cover an expansion of services, job responsibility, and human resources capacity. It also appeared that the requirements to have a Learning Technology Support Unit occurred unavoidably and required that the unit become the responsibility of the IT Unit. This may cause problems later.

5. Summary

In this chapter, it appears that a conceptual framework of an implementation model of e-learning that had been developed in the western countries is not a blueprint and cannot simply be adapted unchanged for nursing education in Thailand. Each organisation has its own characteristics and culture. These characteristics and cultures should not be overlooked when managing change in an institutional context.

Having said that, the conceptual framework developed in the main phase of this study has provided me with the cognitive tools needed in order to address the problems with change more theoretically. It has emphasized many points that appear in common whether in western countries or in Thailand. Here is a list of some similarities:

1. E-learning always begins with technological implementation, but the availability of resources that are required to make implementation work should be considered, such as hardware, software, teaching materials, and most importantly – access to funding.
   This point has also been addressed by Ely (1999).
2. Focus has been on technology rather than pedagogy.
3. The purpose of e-learning is unclear to the institution.
4. Implementing technology is easier when compared to changing the mindset of people who are involved in the change process. The biggest concern in this

change is the readiness of the academic staff to accept the concept of teaching and learning and put it into practice.

5. Academic hierarchy can cause difficulties in developing collaborative work or collaborative practice.
6. Availability of time for the individual to contribute to the change process.
7. Lack of incentives to support the change process.
8. Role-Status-Power of Change Leader/Manager.

It is clear that there was a great improvement of using IT in the Faculty compared to the pilot study. The policy support from the national level had become influential in a university and faculty context. This external force had increased an adoption rate of innovation in the organisation.

However, several hindrances that appear along the process should be highlighted:

- Rigidity of organisational structure
- Lack of clarity of what eLearning was and how technology could enhance teaching and learning.
- Lack of a strategic plan and clear direction of the organisation in employing ICT.
- Lack of leadership to manage the e-learning project further.
- Lack of staff that has an appropriate skill to handle this kind of innovation, and manage change in the organisation.
- Lack of incentives for staff to learn new skills
- Faculty atmosphere:
  - Research-based, not teaching-based atmosphere.
  - Less teamwork, less collaboration, but high competition in the Faculty
  - No learning from failure. Failure is considered to be shameful and unacceptable. It is clear that no written evidence in any faculty reports mentioned unsuccessful stories. It seems the documents had reported only the positive side.

These are all-important points, and help explain why the implementation model needs to be based on a conceptual framework drawn from the case study evidence, field notes, and working experiences with a national funding project, Higher Education Academy Health Sciences and Practice Subject Centre. However, the model should be devised for applicability to the cultural and 'IT development stage' context of Mahidol University. In particular, the hindrances noted above trigger particular attention that needs to be paid to the status and expertise of staff, the leadership structure, staff development, and faculty atmosphere.

Chapter 9: Reflection

Having explored the change process and working with change until now, it should be remembered here that this study aims to explore and develop an appropriate implementation model of e-learning (previously tele-learning) for nursing education in Thailand, and also explore the potential implication and success factors for the implementation of e-learning at the Faculty of Nursing (FoN), Mahidol University in Thailand. This includes exploring and selecting an appropriate mixed media and technology of e-learning that fits the teaching and learning needs at the FoN. The main research questions are:

1. What is an appropriate implementation model of e-learning for nursing education in Thailand?
2. What exemplars from the western countries could contribute to the development of the model?
3. How can literature in ICT, e-learning, tele-learning, and theories of innovation and change inform the development of this model?
4. Is the new e-learning model appropriate for on-campus and off-campus learning?

The study has been divided into three phases, the pilot phase – in Thailand; the main phase – cases in the UK and the Netherlands; and the final phase – back to Thailand. Case study and qualitative approaches were chosen in this regard to conduct the study. Results from the three phases gradually contributed to the formation of a conceptual model of how to implement e-learning to nursing education in Thailand. Results from the two case studies in the main phase, based on a western country context; intensive engagement with the literature; and my experiences in the change process while working and researching in higher education in the UK, had given me a picture of how to introduce change in an institutional context. The final phase of the study had helped identify the distinctions that appeared in different contexts, as well as ensuring some similarities that could happen elsewhere.

I am now revisiting the theoretical framework to explore how theory can help inform practice or vice versa, and how it can also help in identifying gaps between these two. Results from the last two phases of the study, inform me of a clearer picture of what an appropriate implementation model should be for the Faculty of Nursing (FoN) at Mahidol University in Thailand.

In the theoretical framework, as discussed in Chapter 4, I had covered theories of innovation and change from technological and communication disciplines, and then merged them with managing change theories. Understanding the process, especially when it interacts with an organisation should provide the change manager with a wider concept of change, and concepts derived from managing change theories should be a tool to help him/her develop an appropriate strategy to deal with change, so he/she could handle change well. A systematic approach, or macro-level approach, is a key that was addressed in the framework; also, to reduce its rigidity, an individual approach was suggested to cover the framework. This has been expanded to cover managing change theories, and the 'Innovation Triangle' (Smale, 1998) was introduced in the last part of the chapter. The sections after this will address some specific issues. We will explain some specific details in regard to these approaches in this chapter. Having said that, some points could be merged together, while some should be modified to cover specific requirements of individuals.

1. E-Learning: Managing the transition

Lessons that I have learned throughout this research ascertain the point that planning is essential in implementing a change process. As mentioned in Rogers' model, 'Innovation process in organisations' (see Chapter 4, section 1.2), he stresses the importance of the planning stage, and he emphasizes that implementation should support organisational needs. He describes the two steps in the initiation stage that comprises agenda setting and matching, see Figure 4-3. His model has made a good suggestion and highlighted the point that organisation goals, aims, needs, and specific requirements should be clarified in an early stage. He mentions this as a vital part in developing an appropriate plan. Additionally, it should be noted here that Rogers' model is based on the principle that innovation can be revised to serve organisational

requirements, and an organisation can be restructured to facilitate change. These two will be matched together to formulate an appropriate plan for implementing change.

A similar concept has also been addressed from managing change theory, but employing a different term 'assessing organisation' to cover organisational capacity, culture, circumstances, and the like. (Branch 2002)

However, findings from the literature review, and results from the study, have clearly indicated that a clear aim to implement innovation/change may or may not be developed in an early stage of the change process. In some case, change was introduced to the organisation because of the push of technology, or policy-force, but not a problem-driven from the organisation itself. In other words, it is not always internally driven.

Because user requirements are dynamic, as well as the innovation itself, planning should be flexible enough to respond to change quickly and appropriately. Having a clear goal to develop a plan is essential. It may or may not fully develop at an early stage, but communication is essential to transfer a clear image of the future to the people involved in the change process, and keep them informed regularly.

Concerning a stage of organisation on an adoption timeline, if an organisation considers itself an innovator, or in the frontline of adopters, like University of Minerva, it is important that the change leader should have a clear vision, and be able to transfer his/her vision to the administration. In this regard, the change leader would have policy-support, as well as political power in hand to manage and steer change in the direction as planned.

2. Approaching Change

Throughout the study, I have emphasized an implementation stage and attempted to bridge gaps in transforming theory of change into practice. A picture of the change process has become clearer to me. In addition, understanding change in its context and assessing its readiness are vital before developing or proposing any plan to implement change.

To explain my conceptual idea about change, details regarding three major components in the context of change will be provided, followed by an appropriate strategic approach that the FoN could employ.

2.1. Readiness to implement change

It is clear to me that when approaching change three main components should be clarified: organisation, innovation itself, and the individual roles of the people who will be involved in the change process and that provide an understanding of people's mindset regarding the concepts of technology. I have formulated this idea into a graphical diagram. This diagram displays an overlapping of three main circles, see figure 9-1: Conceptual model

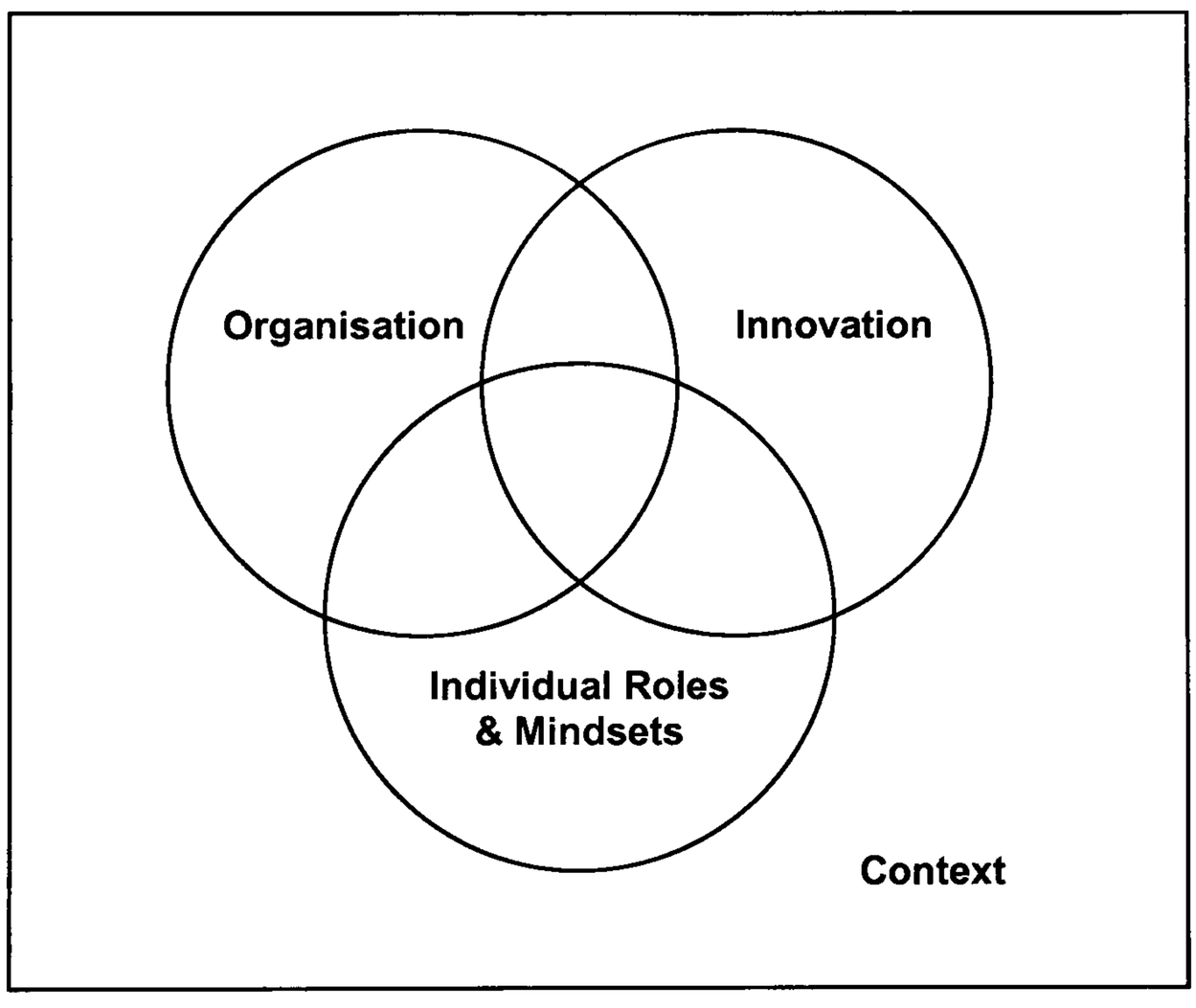

Figure 9-1: Conceptual Model - An interlocking of three entities in the context of change

Similar to 'Innovation Triangles' (Smale, 1998) that I mentioned in Chapter 4, Smale (1998) illustrates the change management model by using four levels of interlocking triangles to develop the model. The model starts by encouraging the change agent to be clear what is going to change. Asking the question 'what changes, what stays the same', clarifies that introducing change to an organisation does not require a change of everything. The point is that the conceptual model in Figure 9-1 was derived from

the same ground of the first level of the innovation triangles model.[29] The difference is the overlapping sections of the three entities that indicated the degree of involvement of individual components in the context of change, and brought us back to the question, "what changes, what stays the same?" In addition, Smale (1998) refers to a triangle as 'identifying people', while I prefer to make this more precise to the point of individual roles in the organisational context and the context of change. Results in the final phase have highlighted an issue of changing people's mindsets as a vital part in having them collaborate and be engaged in the change process. Assessing this in an early stage should also ease in identifying the scope and size of change, as well as identifying the impact of change in specific parts of the organisation and roles that will be affected in this process. The following sub-sections will explain details of individual entities that appear in Figure 9-1.

Organisation – Understanding Context

Branch (2002) emphasizes the importance of in-depth understanding of the existing organisation, its lifecycle or development stage, and its environment. She refers to the literature in managing change that consistently addresses the danger of embarking on organisational change without conducting an organisational assessment to ensure an understanding of the key elements of the organisation's performance, combined with information about the external environment and the future vision to develop change strategy. Clarifying organisational boundaries and identifying stakeholders should also be included in this assessment.

> The organizational assessment needs to take into consideration where the organization is in the growth and evolution/ development (lifecycle) process so that the change process can work 'with the flow of the tide rather than against it' (Greiner 1998:8)

Additionally, the mission of the organisation, and organisational structure should be elucidated. The appropriate strategy or approach to introduce innovation or change will not work or adopt well unless these points have been clarified.

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[29] The first level of the "Innovation Triangle' comprises three triangles; *understanding context, analysing innovation, and identifying people*. See figure 4-5, p. 90

Evidence from the study in the last two phases ascertains that the organisation is unique and has its own identity. They prefer to have change while retaining their own identity. This issue is not new and has been highlighted, for example, in the Finnish Report when they introduced ICT to Finnish Education (Sinko and Lehtinen 1999).

> "This development is leading to some transformations that educational policy decisions must take into account. The central issue is how the political steering of educational content and curricula should be defined in this new situation, shaped as they are by multiple media and efficient global networks. What should be regulated and who can regulate the increasingly globalised production of educational material? How do we safeguard national interests such as a nation's own identity, language and culture when the production of educational materials is becoming increasingly Anglo-American and globalised?..." (p. 30-31)

Organisational culture is another essential factor that should not be overlooked. In particular, the organisation that has a long history usually has a high resistance to change and takes a longer time to accept it. Evidence from two case studies, Minerva and Primrose, can support this, since the University of Minerva is a young entrepreneurial school compared to the University of Primrose that was established in 1828. This concern refers to the case of FoN in Thailand that comes with more than 100-years history.

Lewin's three-stage change model (1952) – unfreeze, change, refreeze – also describes that organisational change can occur at three levels and each level requires different change strategies and techniques since the patterns of resistance to change are different. These three levels are: changing the individuals who work in the organisation, changing various organisational structures and systems, and directly changing the organisational climate or interpersonal style (Goodstein and Burke 1993). What Lewin explains by combining a three-stage change model with three-level change model (individual, structures and system, and climate/interpersonal style), is similar to what happened in the main phase of the study. Classifying the

organisation into three levels does help in developing strategies to manage change properly, since change at each level requires a different approach.

A few more important points should be emphasised here. Academic hierarchy and competitive atmosphere, as part of organisational climate, appear to hinder the change process, for example no support for a teamwork atmosphere or collaborative work, and the like. Respectfulness as a team member equally is unlikely to happen. This is perhaps due to the rigidity of organisational structure and unclear line of management to support change that may not fit well with the organisation's processes. Formalizing a separated e-learning development unit under the Faculty's structure may help in eliminating/mitigating this problem. This means that the Faculty has to make the organisational structure a little more flexible to establish a new unit or allow change to happen. Evidence from the main study and VLE development has illustrated clearly that having a responsible unit in e-learning apart from a technical system unit would be a practical solution to handle this change. This could make the line of management clearer, and clarify scope of responsibility at the beginning to form an appropriate strategy and operational plan, and help in the evaluation process afterwards.

Christensen (2000) explains that when an organisation needs new processes and values, because new capabilities are required, it must create a new organisational space where those capabilities can be developed in several ways. By explaining the organisation's values, and type of business opportunities, along with the organisation's processes, he has proposed four alternatives in different circumstances, see Table 9.1.

Table 9-1: Strategies for Enhancing Effective Change Response

Requirements of New Opportunities	A. Good Fit with Organization's Values about Type of Business Opportunities	B. Poor Fit with Organization's Values about Type of Business Opportunities
1. Poor Fit with Organization's Processes	Use a heavyweight team (the relevant people pulled out of their existing organization acting as general managers for the new initiative), but operating within the existing organization	Use a heavyweight development team (the relevant people pulled out of their existing organization acting as general managers for the new initiative), in a separate spinout organization
2. Good Fit with Organization's Processes	Use a lightweight team (a cross functional team matrixed from their existing positions) operating within the existing organization	Development may occur in-house through a heavyweight team (the relevant people pulled out of their existing organization acting as general managers for the new initiative), but commercialisation almost always requires a spinout

Source: *Christensen, Clayton M., and Michael Overdorf. 2000. Meeting the Challenge of Disruptive Change. Harvard Business Review 78(2 March-April):75.*

Note: The idea of heavyweight teams was developed by Kim Clark and Steven Wheelwright (1997).

It is beyond the scope of this study to explore each possibility in-depth, or compare how applicable each individual alternative is in the FoN's context. However, their ideas and suggested solutions are worth considering in management decisions, and perhaps could provoke some thoughts to pursue in further exploration.

To me, these strategies have addressed some good points. Although these developed in business organisation context, it is still useful and can help in explaining why the IT-unit at the FoN, as well as the E-learning Unit did not work well in the FoN context. It is simply that jobs the IT-unit did not fit well with the FoN processes, and the administrators had used 'a lightweight team' to handle jobs that exceeded their capacity. If we are going to employ these suggested strategies, the message that should be sent to the FoN is to encourage the administrators to have 'a heavyweight team' to handle the E-learning Unit, as appearing in cell 1A or 1B.

Understanding Innovation

So, what is e-learning then? From a theoretical point of view, we are encouraged to clarify the meaning of innovation and understand its scope in an early stage. This

includes the clarifying of requirements to have in the organisation and expected outcomes. This will also help elucidate an impact of change and scale of change that the innovation will make.

In this case, it would help if the change manager at the Faculty of Nursing (FoN) at Mahidol University had a clear vision and understood well what e-learning is, and what type of e-learning that he/she would like to implement at the Faculty. In this case, the change manager is in a position to suggest and select some specific components of e-learning.

However, in practice, it is evident from the final phase that the unclear definition of e-learning has become a problematic. Faculty members have a different understanding of e-learning and looked at it from different perspectives. In the Primrose and Minerva cases, they defined their own meaning of what they would implement, and that meaning is not necessarily the same in every place. Thus, definition itself is not a problem, but the ability to develop and communicate a clear image of the future is an important matter. Having people discuss and express their thoughts could help develop shared meaning, and encourage them to be part of the change process. Shared meaning is essential in convincing people to move forward in a planned direction, with less resistance. In addition, it encourages people to engage in the university activities and the implementation process.

In this e-learning context, we are talking about two major components that are integrated in one pack of innovation: technology and pedagogy. It is obvious that in the initial stage of implementing e-learning, technology has dominated pedagogy, and implementing e-learning has always begun with technology. Technology has now become a symbol of high performance and is expecting to make the organisation stay abreast. Although pedagogical awareness has been raised in a later stage from academic staff, it took sometime to have their voices heard at a strategic level. This is perhaps due to the requirements to have technological infrastructure in place first before shifting the focus to pedagogy. Users may require sometime to become familiar with the innovator in the initial implementation stage.

As appeared in this study and elsewhere, technology has been involved in education for years now. The turning point of distance learning from postal delivery to electronic delivery is a good example. Technology was brought in as a tool to deliver media flexibly without changing teaching and learning styles (Bates 1995). However, now in an e-learning era, scholars clearly accept that e-learning has introduced new methods of teaching and learning. Studies to associate pedagogy with e-learning in practice were seen published more in the last few years (Britain and Liber 2004; Mayes and Freitas 2004), with increased funding available to support this theme (see JISC e-learning programme[30]).

It should also be noted that the Faculty, during this time, was in a stage where technological infrastructure became a major concern in policy and budgeting, but, as stated, technology is just a part of e-learning. There are other important parts that should be developed along with the development of technology. This is not a linear process, and one does not necessarily begin after the other.

Implementing technological infrastructure clearly requires a heavy investment in cost, both initial and maintenance cost. In fact, the investment should cover hardware, software, and people ware. Despite technical equipment, issues regarding the lack of staff with specific skills to work/support e-learning initiatives are crucial. As stated in Chapter 8 (see section 8.2), developing e-learning requires multidisciplinary team members, for example content specialists, instructional designers, graphic designers, programmers, system administrators, and the like. Software investment to accommodate e-learning is another concern. An interesting example that was highlighted here is selecting an appropriate VLE to put on a university system. Whether the organisation will choose proprietary software or open source, it should be planned carefully. Whatever choice they make, there will be costs. As discussed in Chapter 8, having open source VLE does not imply that organisation will pay nothing. Obviously, cost for software license will be waived, but as with ordinary software, it will require technical support and training, as well as cost for customising software to serve the organisational requirements. The benefit of having open source is not just in reducing the cost of software license annually, but in allowing IT persons to modify the system, and possibly interoperate it with other software modules on the

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[30] See JISC e-Learning Programme: http://www.jisc.ac.uk/programme_elearning.html

organisation system. This issue has also been highlighted in the JISC e-learning programme, and e-learning technological framework that has been developed and proposed to the academic community (Wilson, Olivier et al. 2004).

It should be emphasised again that technology is a tool to accommodate this work. It is part of e-learning, but not e-learning itself.

Individual Roles and Mindsets

> …Change is implemented by and has consequences for people, and that change can be made significantly less traumatic and more successful if these human aspects are anticipated and handles effectively.
>
> (Branch, K.M. 2002:10)

Apparently, people who are involved in the change process have different roles and status and different degrees of involvement. They could be executives, policy-makers, academic staff, academic support staff, technical staff, librarians, or students. In other words, they could be the Change Manager/Change Leader, Change Agent, developer and supporter – who develop and/or modify change to fit into an organisational context and serve user requirements, and users – who have been encouraged to accept change. It is clear that implementing innovation requires people with multi-disciplinary knowledge and skills to work together as a team. However, a strong academic hierarchy could hinder this development. Developing teamwork and working collaboratively appeared very infrequently, particularly with staff who did not have the academic positions to be part of the team.

Despite e-learning changing the technical infrastructure, and in some cases, introducing people to learn from computers, it has revealed teachers' abilities and their teaching skills. Changes that e-learning have introduced to the organisation are much more than anticipated, and sometimes result in the organisation's inability to cope. As stated, e-learning is not just changing the mode of delivery in terms of learning courses or learning materials, but e-learning has changed how teachers and students teach and learn, and how they communicate with each other. The important

point that should be underlined is how to change people's mindset and encourage them to reconsider concepts of teaching and learning in the light of technology.

Regardless of their roles, members of staff require support and training to help them understand and begin to adopt this change. Results from the main study indicate that there were some academic staff interested in and some who were enthusiastic to use technology in their teaching courses, but the School or Faculty lacked the central support to help them engage with technology. Some complained regarding the lack of hardware to support academic work, and some had to learn new skills by themselves without support from the FoN.

It is a time to bridge these gaps, and rethink their roles and positions in the organisation context, and clarify what they can do best in the scope of responsibility. How can staff training programmes help with this? And how can the organisation identify which skills the staff will need to be able to support new, coming and sustainable change?

Change management is another important role that should be discussed. We will refer to this later in the chapter (section 3: Leading Change), and the distinction between change manager and change agent will be explained, and will identify their roles and power in managing change.

2.2. Strategies to approach change

As stated in Chapter 4 about introducing change to the organisation, we have discussed a macro and micro perspective, and systemic and individual approach when managing change in an organisation. The scale of change and impact that change could make during the process can help in clarifying what an appropriate approach should be. In this case, the scale of change is in Faculty and University levels, it is clear that employing a systemic approach is more applicable to managing change.

This does not suggest we ignore the individual approach. On the contrary, combining this approach with a systemic approach could help in encouraging people to participate in the change process. Evidence from many studies indicate that it can

reduce resistance to change and increase the rate of acceptance (Coch and French 1948; Judson 1991; King and Anderson 1995).

The top-down approach, in this case, has successfully implemented change in a few years time. It seems to work well with radical change. However, it should also be noted that the size of the organisation has an impact on speed of delivering and adopting change. Since this approach relies solely on a leader, the person at the top of the pyramid, the limitation of this is there is a risk of failure if the leader is incorrect. Another alternative approach is to develop a shared vision, so that people can share a common set of goals, a common perspective on what to do, and how to accomplish it; and share a language, values, and premises about what needs to be done and how to do it (Pfeffer 1993). However, developing shared conception takes time and effort, and may not be applicable when the organisation is in crisis or has insufficient time to carry on the related activities. For this reason, the top-down, precisely hierarchical chain of command, rather than a bottom-up approach, is necessary to implement radical change (Nicholson 1993).

In case of the FoN, the organisational culture inclines to be the top-down approach, though a bottom-up approach seems to make the system more sustainable and could potentially establish cooperation culture in the organisation. In my opinion, a vertical approach – both top-down and bottom-up – does not suffice to speed up the change process. A horizontal approach (Ostroff 1999), similar to a peer-to-peer approach as Rogers (1995) mentions (see Chapter 4, section 4.1, 4.2), could help in increasing the speed of adoption and accepting change.

3. Leading Change and the Change Manager

To introduce change to the organisation, it is important to have somebody leading the change. The change agent, or perhaps the change manager, may not necessarily be an executive of the organisation, but should be a person who understands the change well, has a clear vision of what change will bring to the organisation, and importantly, has leadership skills to lead the change throughout the process. The position of the change agent can have an impact on the success or failure of the change process. The change agent should consider that he/she has to have power in hand in some respect,

and should understand 'power in organisation' well. It is a strategy, probably tactics, to know how to get things done, particularly through a hierarchical authority like the FoN.

The distinction between change agent and change leader that should be considered are their roles, position, and power in hands. These distinctions can be seen clearly from the Minerva and Primrose cases. Minerva had a clear role of a change leader with power in hands to manage and lead change, while Primrose was likely to be just change agent. Becoming a change agent as a knowledge specialist or having personal interest in e-learning without having the power or not being in the right position may not help steer change effectively. This is why the speed of change at Primrose was slower than what had happened at Minerva.

Mile (1997) emphasises that transforming change is vision-led rather than problem-driven, but having a change leader who knows about innovation, understands change, has a vision, and stays in the right position to move the change forward effectively is not easy. This situation appears in many places in the UK, and also elsewhere.

Wilson (1992) addresses that planned change has put more focus on the change manager, and has an assumption that training courses can help change managers develop management skills to handle change. Indeed, success or failure of implementing change relies on change manager skills only. Wilson describes that this is different between the US/UK and Sweden/Japan. For the latter group, the change manager is not one person but rather a group of people who take responsibility in making decisions in the change process. In addition, power is not with one person, and success or failure of managing change does not rely only on the change manager's management skills, but includes understanding the organisational context and political process of the organization.

What I have learned from this study, indicates that Minerva has employed a planned change that is mission-oriented to lead and manage change in their organisation, and it has worked successfully. Although the change manager/leader of Minerva is mission-oriented, it should be noted that she had employed participation techniques to engage academic staff in reshaping the change process. Having an in-house development

VLE, Minerva was in a position to modify the system to serve users' specific requirements.

However, with Primrose, the change agent does not seem to have a power in hand to manage change as required. Power and decision are still with administration; only implementing change and managing it thereafter would rest in the change agents' hands. It should also be noted that appropriate timing is important in this case. At the time that Primrose implemented WebCT, the national framework about e-learning had not been established yet. It came a few years later, after e-learning had been recognised throughout the country and internationally. This point is just to illustrate that implementing change during the rising tide could increase adoption rates exponentially and with low resistance to change, since the external forces can help stimulate change, due to policy and funding support and the like.

Coda: Researcher & Change

My research story began with a small question in mind: to find an appropriate way to exploit technology to enhance teaching and learning in nursing education in Thailand. By using the Faculty of Nursing at Mahidol University as a case study, I began to draw out a picture and possibilities that could help inform the decision, and expected to introduce this in a strategic plan thereafter. With my personal experiences studying and working in IT for years, I had developed a small IT team at the Faculty – partly to perform technical support, and partly to establish a concept of technology, develop IT infrastructure, increase IT-skill of the faculty members, and to some extent integrate IT to teaching and learning context. We were fortunate to have team members who had a strong inspiration and believed that we could make things better by using technology wisely. This has been fostering, from time to time, by some academic staff, who would like to see positive change happen in the Faculty.

Similar to the change occurring in many places where change agents/change managers had to suffer with agony and pain along the line of the change process, my study began with a concept of tele-learning, and finally moved towards e-learning. At the time, it was in an early stage of e-learning. In fact, a new generation of Distance Learning just started and many things were in transition, changing from one generation to another. After reviewing the literature and exploring the research context, I began my pilot study in Thailand. I was new to qualitative research methods, and that took me sometime to read and understand more about this kind of research.

Data collection began based on two case studies in western countries, including my personal experiences working with the Higher Education Academy Health Sciences and Practice Subject Centre based at King's College London, which gave me an opportunity to be involved and participate in the higher education system in the UK and allowed me to understand more of the educational system that I was unfamiliar with. When performing research activities during the study, such as conducting data collection, doing data analysing, exploring more on theories of innovation and change as well as theory of learning, reviewing related literature, and working in the Higher

Education Context in the UK, I began to formulate a conceptual framework and subsequently it has been crystallised. This led me to see the difference in dimensions of change, and understand how to react to change regarding my role and position in that context.

Going back to my home country and collection data in the final phase at the FoN, I became a *stranger* in my country and became an *outsider* of my workplace. Physically, nobody would recognise any difference in me, but my perception and particularly my lenses have now changed. The research process had provided me with self-development as well as changing my view, perception, and interpretation. Inevitably, I am now becoming part of the change process.

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Glossary

ACM	Association for Computing Machinery
BNS	Bachelor of Nursing Science
CAI	Computer Assisted Instruction
CAL	Computer Assisted Learning
CMC	Computer-Mediated Communication
CTI	Computer in Teaching Initiative Project
CTL	Computer in Teaching and Learning
DL	Distance Learning
DSS	Decision Support System
EML	Educational Modelling Language
FDTL4	Fund for the Development of Teaching and Learning Phase 4 Project
FERL	Further Education Resources for Learning
FoN	Faculty of Nursing, Mahidol University, Thailand
FTP	File Transfer Protocol
GPL	General Public Licenses
ICT	Information and Communication Technology
IDLE	Integrated Distributed Learning Environments
IMS	Instructional Management System
IS	Information System
IT	Information Technology
ITOL	IT-Based Open Learning Model
JISC	The Joint Information System Committee
LAMS	Learning Activity Management System
LMS	Learning Management System
LRC	Learning Resource Centre
MIS	Management Information System
MLE	Managed Learning Environment
MOE	Ministry of Education
MUCC	Mahidol University Computing Centre
MUC-Net	Mahidol University Campus Network
NECTEC	National Electronics and Computer Technology Center
NITC	National IT Committee
OKI	Open Knowledge Initiative
ONEC	Office of the National Education Commission
OSS	Open Source Software
OU	Open University
OUNL	Open University in Netherlands
PBL	Problem-Based Learning
RLO	Reusable Learning Object
School-Net	School Network
SONIC	Students On-line in Nursing Integrated Curricula – FDTL4 project
TLRP	Teaching and Learning Research Programme
UCISA	University Colleges and Information System Association
Uni-Net	University Network
VLE	Virtual Learning Environment
WHO	World Health Organisation

Appendix A: Pilot Questionnaire

Cover Sheet:

The development of information technology in this decade involves many fields including nursing education. Results from many researchers have found that the use of information technology can improve nursing education, research, practice, and nursing administration. The Faculty of Nursing at Mahidol University realized the importance of information technology in nursing education and established an Information Technology Unit to serve the needs of students, instructors, and officers in the Faculty to facilitate their works.

This questionnaire is a part of research, which developed for three main purposes to serve the Faculty's policies: Firstly, one of the main purposes is to identify the necessary general knowledge and computer skills to fulfil the purposes of our instructors. The results will help our unit in setting up the appropriate training courses and providing other facilities for them in the future. Secondly, to identify the services those instructors need for facilitating their work. The last one is to find out the methods of teaching and media our faculty are currently using. The results from this part will help in developing an IT-plan for integrated new technology to our nursing education in the future.

With these reasons, I would like to ask your cooperation in spending your time in completing this questionnaire. Your answers will be kept confidential, and results from this questionnaire will be used for developing our plan to serve your needs as much as possible.

Kwansuree Jiamton.

(Researcher)

Note: This questionnaire has a total of 3 pages and has been divided into 4 parts:

Part 1: Personal Data

Part 2: Computer knowledge and skills

Part 3: Computer Services

Part 4: Your teaching course(s)

Part I: Personal Data

1. Gender: ☐ Male ☐ Female
2. Age: ……..yr.
3. Your highest level of education:
   - ☐ Bachelor Degree in ……..……
   - ☐ Master Degree in ……..……
   - ☐ Doctorate Degree in ……
4. Your teaching experiences (total): ……. yr.
5. Do you have a spouse?
   - ☐ No
   - ☐ Yes. Does your spouse have a computer?
     ☐ No ☐ Yes
6. Do you have any child(ren)?
   - ☐ No
   - ☐ Yes. How many?: ……
     Age(s) (Please specify respectively): ……..……..……

Part II: Computer knowledge and skills

7. Have you ever used a computer before? ☐ No ☐ Yes
8. Do you have a computer at your home?
   - ☐ No
   - ☐ Yes. Please specify the type of work that you do with computer(s)
     1. _____
     2. _____
     3. _____
     4. _____

     _____
9. Please specify the types of programs in the following list that you have ever used before and indicate whether you need training or not.

Types of Programs	Have you ever used?		Need training?	
	Yes	No	Yes	No
• **Word Processing** (e.g. CU-writer, RW, MS-Word, …)				
• **Spreadsheet** (e.g. Lotus, MS-Excel, ...)				
• **Presentation** (e.g. Power Point, …)				
• **Database** (e.g. Dbase, FoxPro, FoxBASE, MS-Access, …)				
• **Statistics** (e.g. SPSS, Epi Info, Stat View, …)				
• **Browser** (e.g. Netscape Navigator, Internet Explorer, …)				
• **Reference Programs** (e.g. Endnote, Reference Manager,)				
• **Other** 1. ……				
2. ……				

10. Please check your level of confidence in each item displayed below.

General knowledge and skills in using computers and Applications	Level of confidence expressed				
	Very high	High	Moderate	Low	Very Low
General knowledge and skills in using computers					
• Connect monitor and printer to the computer					
• Switch on and boot up system					
• Understand how to handle disks safely to avoid damage					
• Format diskettes					
• Make a backup disk					
• Write protect diskettes					
• Run programs					
• Open and copy files					
• Use mouse					
• Use keyboard					
Word processing					
• Create text/document file					
• Delete and insert text					
• Mark, copy, move, and delete blocks of text					
• Search and replace text					
• Print out document					
• Load and save files to and from disk					
• Use a spell checker					
• Create and use a variety of text, paragraph and heading styles					
Presentation					
• Slide set up (size and layout)					
• Use template					
• Create presentation					
• Print handout					
Computer Network System and Communication Technology					
• Access to internet					
• Use email					
• Search and retrieve data from websites					

Part III: Computer Services

11. Have you ever used the **computer room** of the Faculty?
    - ☐ No
    - ☐ Yes. How many times have you used the computer room in the last two weeks?
      Please specify: …….. times.

12. Please specify the services you used in **computer room**? (More than one item can be checked.)
    - ☐ Email
    - ☐ Data Analysis
    - ☐ Word Processing
    - ☐ Other (please specify) ……

13. Were you satisfied or not satisfied with the services you received at **computer room**?

    - ☐ Very satisfied
    - ☐ Satisfied
    - ☐ Not satisfied

    With what service(s) are you are not satisfied? (More than one item can be checked)

    - ☐ Service time is limited
    - ☐ Not enough computers
    - ☐ Other (please specify) ……

14. Please specify your expectation about the computer system in the Faculty.

    - ……
    - ……
    - ……

Part IV: Your Teaching Course(s)

15. Please give the title of your teaching course(s).

- .....
- .....
- .....

16. Please check the method(s) of your teaching and media that you use in your course(s).

Method of Teaching and Media	Course Level						
	Bachelor				Master	Doctorate	Specialty
	Y1	Y2	Y3	Y4			
Methods of Teaching							
• Lecture							
• Seminar							
• Problem-based Learning							
• Practice in Skill Laboratory							
• Practice in Hospital							
• Practice in Community							
• Practice in Computer Room							
• Other……..							
Media							
• Print-out							
• Videotape							
• Slide							
• Computer Assisted Learning (CAL) Programs							
• Internet							
• Audio/Cassette Tape							
• Other ……							
• ……							

17. What kind of teaching equipment do you use in your teaching course(s)?
(Item can be checked more than one)

☐ Transparency overhead projector
☐ Whiteboard
☐ Slide projector
☐ Video player
☐ Video camera
☐ Visual presentation (visualizer)
☐ Computer
☐ Multimedia Projector

Strongly agree	Agree	Neutral	Disagree	Strongly disagree

18. Do you think that the computer can help you in teaching?

19. Do you think that the computer can increase the efficiency of your teaching?

Thank you very much for your cooperation. Your answer will help us develop appropriate planning for serving your needs.
Kwansuree Jiamton.

Appendix B: Interview Schedule – Preliminary Phase

Preliminary Phase: Interview Schedule

Interviewees: Dean and Assistant Dean (Management), Faculty of Nursing, Mahidol University, Bangkok, Thailand.
Interviewer: Kwansuree Jiamton.
Date : 16.00 p.m., 9th April, 1999 : Interviewed Dean
15.00 p.m., 30th April, 1999 : Interviewed Assistant Dean
Place: Faculty of Nursing, Mahidol University, Bangkok, Thailand.
(Note: The interviews were conducted in Thai.)

1. What are the meaning of IT and telecommunication technology?
2. What is the perception of using Information Technology and Telecommunication Technology in Nursing Education?
3. Why are these technologies important?
4. Does the Faculty have any policies (either at present or in the future) to support these technologies or not? If so, how?
5. Does the University (Mahidol) have any policies or any plan to use the technologies? How?
6. What are the benefits that will be gained?
7. Are there any problems or limitations if these advanced technologies are brought to the Faculty?
8. What are the factors that influence this matter?

Questions that were performed in reality:

1. What do you think about introducing Information Technology and Telecommunication Technology to use in our Faculty?
2. Why are these technologies important?
3. What are the benefits that you expect to receive from the technologies?
4. Is it possible or not possible to bring these technologies to our Faculty?
5. In your opinion, are there any problems or limitations if these advanced technologies are brought to the Faculty?
6. Are there any factors influencing this matter?

Appendix C: Interview Schedule – Main Phase

Guideline Questions –Main Phase

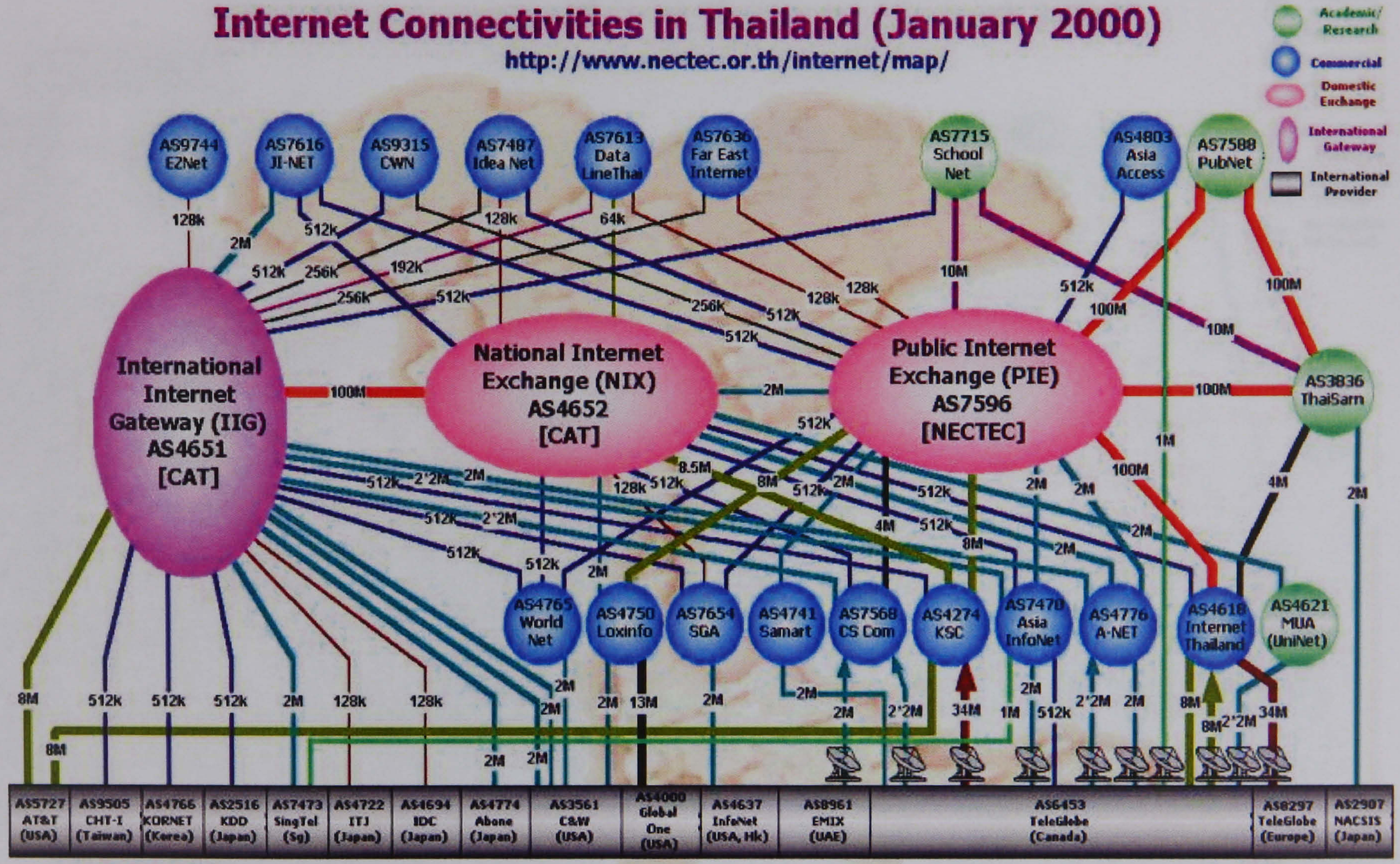
List of Questions	Sources of Data
1. What is the aim of your institution?	- Study official documents
2. Why did you decide to bring the innovation (Tele-learning) to your institution?	- Study official documents - Conduct asynchronous interview, initial phase
3. Does the innovation serve the needs of the institution? Why or why not?	- Conduct asynchronous interview, initial phase
4. How long has the innovation been used?	- Study official documents
5. What are the outcomes currently? Do they serve the needs?	- Conduct asynchronous interview, initial phase
6. Who is/are responsible for implementing the innovation?	- Conduct asynchronous interview, initial phase
7. What did you do before implementing the innovation?	- Study official documents - Conduct asynchronous interview, second phase
8. What level of networking was required to support your vision of learning?	- Conduct asynchronous interview, second phase
9. How will you provide time for ongoing staff development, including time to practice and learn new technologies?	- Conduct asynchronous interview, second phase
10. How will you deal with rapid changes in technology?	- Conduct asynchronous interview, second phase
11. How do you monitor during implementation?	- Conduct asynchronous interview, second phase
12. How do you evaluate the implementation?	- Conduct asynchronous interview, second phase

Appendix D: Internet Connectivity in Thailand

- **January 2000**
- **August 2002**
- **September 2005**

Internet Connectivities in Thailand (January 2000)

http://www.nectec.or.th/internet/map/



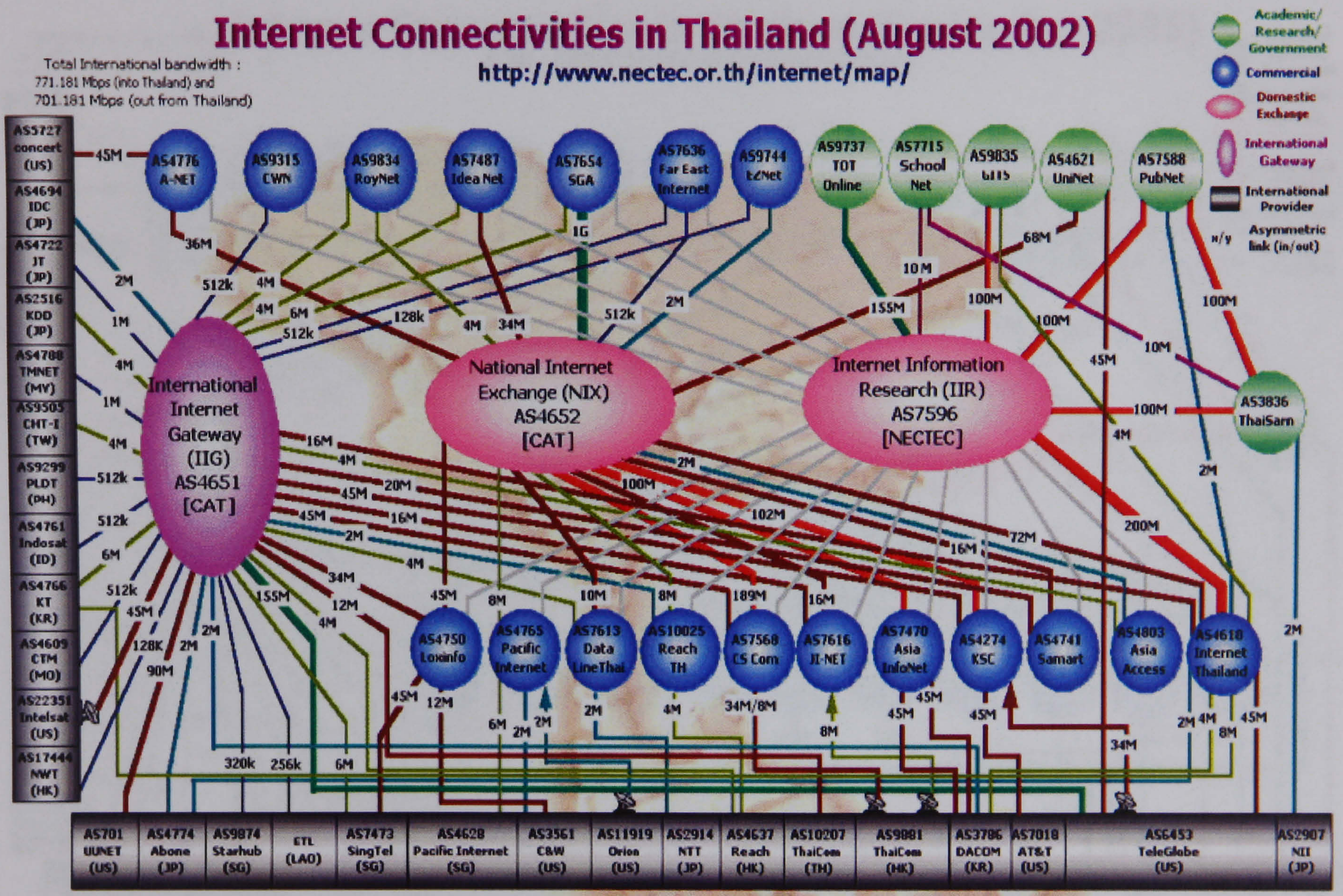
DISCLAIMER

Chart Date: 2000-01-01

Internet Connectivities in Thailand (August 2002)

http://www.nectec.or.th/internet/map/

Total International bandwidth :
771.181 Mbps (into Thailand) and
701.181 Mbps (out from Thailand)



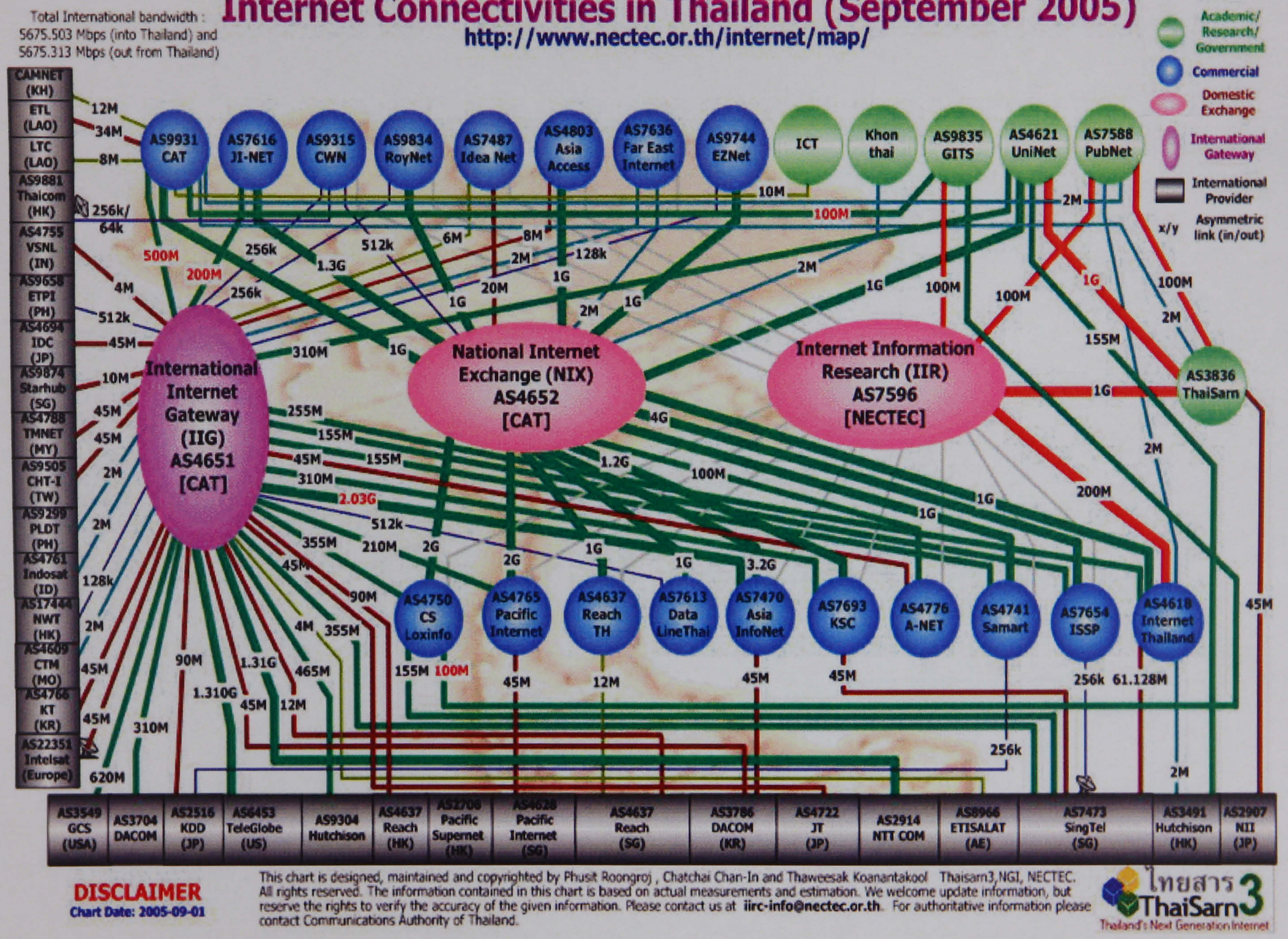
DISCLAIMER

Chart Date: 2002-08-02

Internet Connectivities in Thailand (September 2005)

http://www.nectec.or.th/internet/map/

Total International bandwidth :
5675.503 Mbps (into Thailand) and
5675.313 Mbps (out from Thailand)



DISCLAIMER

Chart Date: 2005-09-01

ไทยสาร 3 ThaiSarn 3
Thailand's Next Generation Internet